TEXAS HIGHWAY DEPARTMENT

Construction & Maintenance

BULLETIN No. 4
Jan. 1951

MID WINTER MAINTENANCE

Foreword

This bulletin is published for the purpose of presenting practical information applicable to current highway problems. These conclusions and data are not necessarily endorsed by the Highway Department nor are they to be construed as instructions. Employees are invited and urged to submit suggestions and relate experiences which would benefit those engaged in the construction and maintenance of highways.

Photographic services are available and other assistance may be obtained if desired in preparing material for submission. All material and comments should be directed to the Chief Engineer, Construction & Maintenance, Austin, Texas.

Published Jointly by

Maintenance Division	D- 3
Equipment & Procurement Division	D- 4
Construction Division	D- 6
Traffic Services Division	D-16

REPRODUCED BY
OPERATIONS DIVISION
TEXAS HIGHWAY DEPARTMENT
AUSTIN,TEXAS

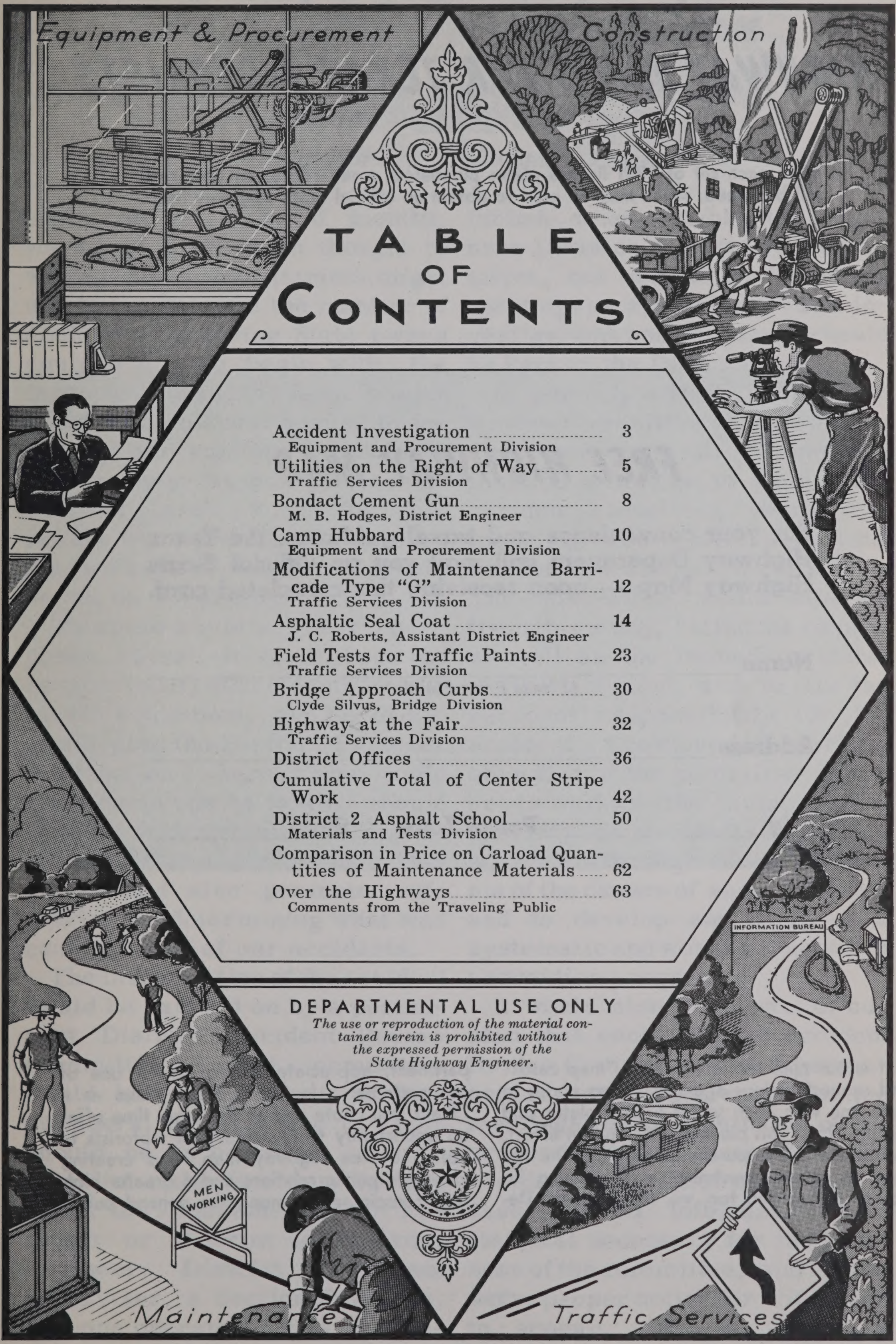

TABLE OF CONTENTS

Accident Investigation 3
Equipment and Procurement Division

Utilities on the Right of Way 5
Traffic Services Division

Bondact Cement Gun 8
M. B. Hodges, District Engineer

Camp Hubbard 10
Equipment and Procurement Division

Modifications of Maintenance Barricade Type "G" 12
Traffic Services Division

Asphaltic Seal Coat 14
J. C. Roberts, Assistant District Engineer

Field Tests for Traffic Paints 23
Traffic Services Division

Bridge Approach Curbs 30
Clyde Silvus, Bridge Division

Highway at the Fair 32
Traffic Services Division

District Offices 36

Cumulative Total of Center Stripe Work 42

District 2 Asphalt School 50
Materials and Tests Division

Comparison in Price on Carload Quantities of Maintenance Materials 62

Over the Highways 63
Comments from the Traveling Public

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HIGHWAY MAPS FOR TEXAS MOTORISTS

With each set of 1951 license plates purchased, a self-addressed post card will be issued, which may be used to obtain an official State Highway Map.

FREE HIGHWAY MAP

For your convenience and travel guidance, the Texas Highway Department will mail you an Official Texas Highway Map — upon receiving this completed card.

Name____

(Please Print Plainly)

Address______________________________________

City________________**Postal Zone**____**State**__________

It is our plan to furnish these "map cards" and request various agencies selling plates to issue one with each set of license plates sold during 1951. This piece of literature in effect, should make the purchaser feel that he has made a sound investment in purchasing his license plates, and too, we, the Highway Department, appreciate having him as one of our customers. In short, it will serve as a "thank you" note and at the same time offer an opportunity to practically all motorists to obtain a free highway map, thus creating desirable public relations and a greater highway consciousness among the general public.

Accident Investigation

A PLAN FOR INVESTIGATING ACCIDENTS INVOLVING STATE-OWNED EQUIPMENT

Equipment and Procurement Division

For the last several months, we have given much thought to various plans the Districts might use to cut down on the number of accidents involving State owned equipment. To begin with, the investigation and the decisions as to what to do about accidents involving our equipment should be kept as near as possible at the District level. It is for this reason we would like to submit a plan we have devised which could be set up in each District.

This plan would serve two purposes. First, it would place the responsibility of accidents involving our equipment, and secondly, would give the District Engineer information whereby he could make decisions as to what should be done with operators who consistently have accidents. This plan would also promote safe driving be determining what was causing most of our accidents.

The investigation of the accident would be carried on by a permanent District Accident Review Committee. This committee would have a minimum of four members, at least one of whom should be an operator. Such a committee should always include either the Assistant District Engineer or District Maintenance Engineer, District Equipment Supervisor, a Section Foreman, and one operator. It is also desired that the committee shall include, when possible, the Insurance Division's safety representative, but only to sit in at the meetings as an adviser. The investigations and decisions should be kept at the District level.

In general, a District Accident Review Committee would serve a dual purpose. Its immediate function would be to study each accident involving equipment including non-traffic accidents, as soon as possible after it occurs. The committee would attempt, from this study, to find the remote as well as the immediate cause of the accident, and to fix the personal responsibility for the accident. The more far-reaching objective of the committee would be to reduce the number and severity of accidents involving equipment through careful analysis of the causes of such mishaps; and to develop and carry on a systematic and workable accident prevention program.

It would also be a part of our plan that each District Accident Review Committee have a permanent secretary to arrange for the meetings and keep minutes of the proceedings, to keep files of accidents records of operators, to assemble all information and material necessary for the business of the committee, and also to serve proper notice for witnesses to appear. Such a secretary should be selected from the regular District office personnel.

Our plan would provide that previous to the review of an accident, the committee should assemble the following:

1. Copy of the driver's report of his accident.
2. If accident was a traffic accident and, if possible, a copy of the Highway Patrol's report should be obtained.
3. Mechanic's inspection report on the vehicle following the accident.
4. Service record of the employee involved in the accident.

When an accident occurs, it should be brought promptly to the attention of the committee since each additional day's delay means that the accident is further in the past and that more and more of the details of the accident may be forgotten.

In the interest of such promptness, we believe meetings of the committee should be held regularly, at least every two weeks.

An accident, to be reportable to the committee, should be defined as "any accident in which our vehicle is involved where such accident results in property damage." Such an accident is reportable to the committee, regardless of what property was damaged or to what extent, where the accident occurred, or who was responsible.

It would be the responsibility of the committee to analyze the details of the accident and to determine beyond a reasonable doubt whether the action of our operator was the primary cause and whether he was guilty of contributory negligence or was blameless. Thus, each accident should be classified by the committee as "preventable" or "non-preventable."

We would define a preventable accident as "any reportable accident in which the operator in question failed to exercise every possible precaution to prevent the accident."

If the committee should decide that a particular accident was "preventable" and that the operator was responsible, the accident then is charged against the driver's individual safety record (kept by secretary of committee). If this is an operator's first or second offense, the committee should notify him of their findings and outline how they think the accident could have been avoided. It is our considered judgment that three preventable accidents should be grounds for immediate dismissal.

On the brighter side of the committee's work, they could, at the end of each year, award certificates to those operators who had not been involved in a "preventable" accident during the year. Then, too, after a year's operation, the committee should be able to define definitely most of the accidents considered to be "preventable." This list could be sent to all operators as a warning and thus create "safety" thinking.

Brief monthly reports of the committee's actions should be sent in to File D-4 where a tabulation could be made of all accidents. This would give us the results of this program on a statewide basis.

Utilities on Right of Way

Traffic Services Division

During the 1949 session of the Texas Legislature, a law was enacted which gave utility companies the right to erect transmission lines on the right of way of city streets, county roads, and state highways. Since passage of this act, installation of many miles of utility lines has been made on our rights of way. In the erection of maintenance of these lines, instances throughout the state have been observed where improper or unwarranted pruning has mutilated or destroyed the usefulness of our trees. Work of this nature promotes a very bad public reaction as evidenced by the complaints we have received.

Large amounts of money have been spent in preserving and planting these trees for the safety, comfort, and enjoyment of the traveling public. When our trees are mutilated or destroyed we not only have an aesthetic loss, but we lose financially as well. There is quite an investment in our trees, whether they have been planted or preserved, and we should be very careful to protect the existing native trees, since they have already reached maturity and the beneficial effects will be utilized over a longer period of time.

Application of the suggested practices listed below, together with the sketches illustrating these principles of tree surgery, will eliminate the bad results we are obtaining from utility line construction and maintenance on the right of way.

I. Locate utility lines with the least possible interference with major plantings or specimen plants.

II. Maintain adequate clearance for lines - - not excessive clearance.

III. All pruning should conform to recognize tree surgery practices.

   A. Preserve natural character of tree.

   B. Remove minimum number of branches to provide adequate clearance.

   C. Amount of clearance should be determined by the rate of tree growth.

   D. Removal of branches as illustrated prevents stripping of the bark.

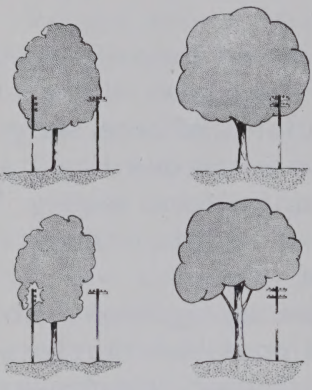
   E. In removing branches the cut should be made at a fork with the remaining branch at least one third the diameter of the one removed.

F. No stub should be left.

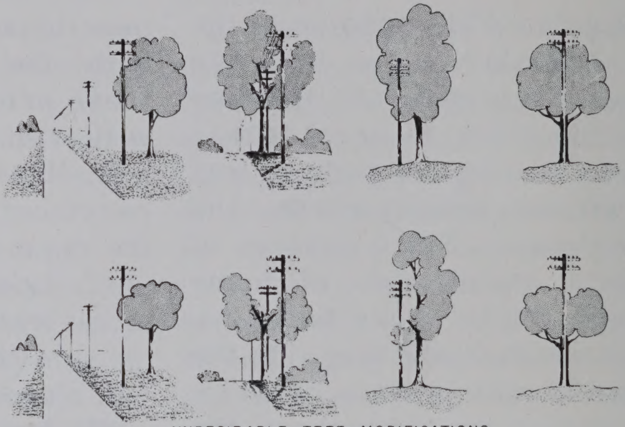
G. All cuts two inches or over should be painted with an approved tree dressing or paint.

H. Trees which must remain unsightly because of repeated pruning for clearance should be removed.

IV. All wood must be removed from the right of way and disposed of in accordance with the laws and regulations of the community, county, and state.

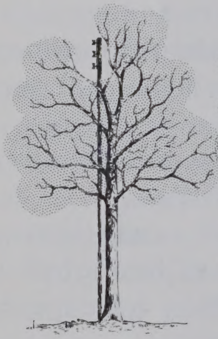


DESIRABLE TREE MODIFICATIONS PRESERVING SYMMETRY.



UNDESIRABLE TREE MODIFICATIONS

Such tree-line relationships as illustrated perpetuates high maintenance costs and right-of-way unsightliness.



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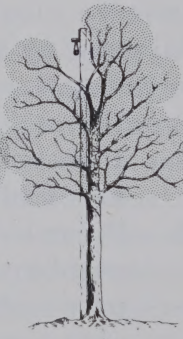

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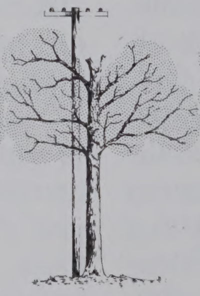

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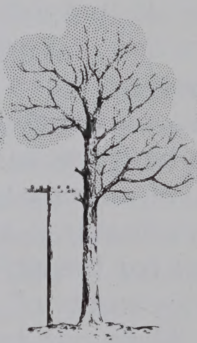

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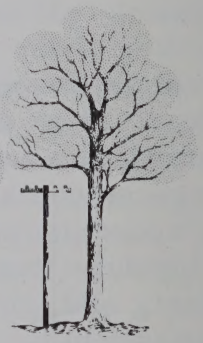

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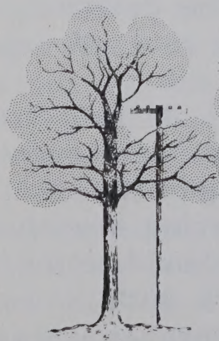

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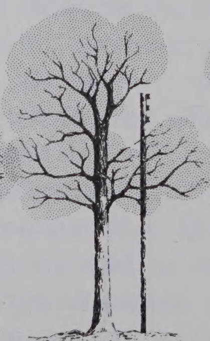

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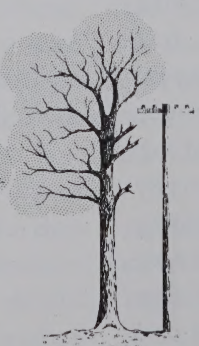
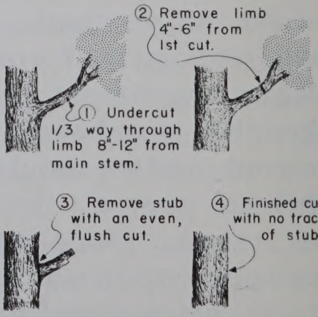


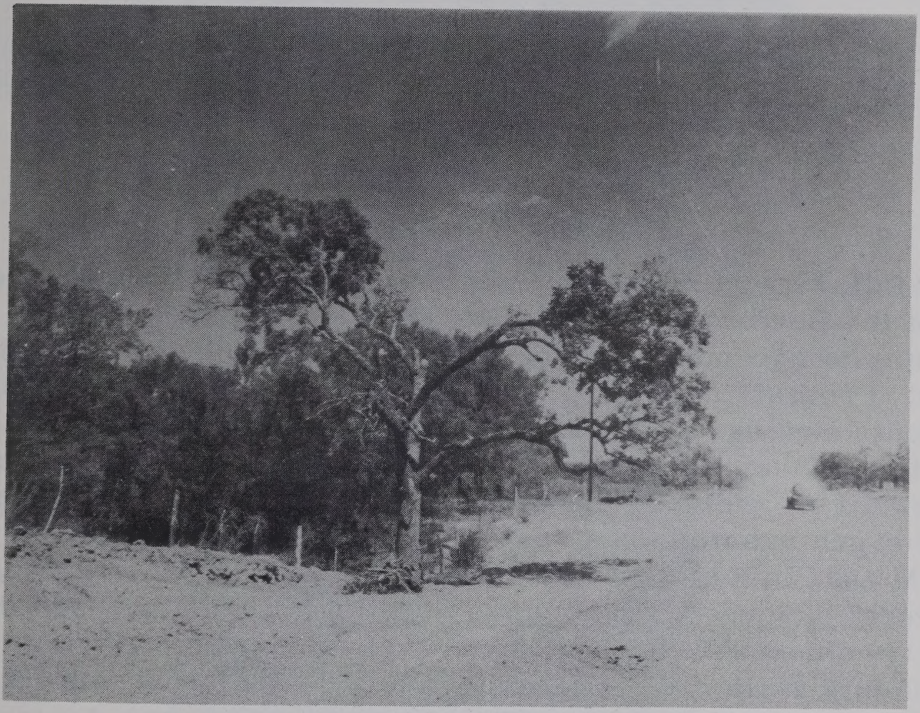
UNDESIRABLE



② Remove limb 4"-6" from 1st cut.
① Undercut 1/3 way through limb 8"-12" from main stem.
③ Remove stub with an even, flush cut.
④ Finished cut with no trace of stub.

PROPER LIMB REMOVAL (2" dia. or more)

Claim and Counterclaim...



Very frequently power line companies, and especially the REA, protest the moving of a line or damages resulting to their line from construction operations. I am attaching a print of a kodak picture taken on F. M. Highway 187 in Uvalde County, and showing the almost complete destruction of a large Pecan tree, 96" in circumference, by the REA line workmen in moving their line.

I understand that they plan on filing a claim for damages to their line on F. M. Highway 1051 in Uvalde County, and should this be done I suggest a counterclaim for the destruction of this beautiful tree.

M. B. HODGES
District Engineer

BONDACT CEMENT GUN

Submitted by **M. B. HODGES**
District Engineer

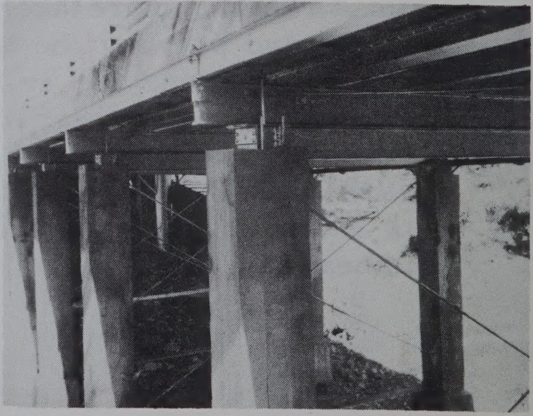
The following pictures show the use of the Bondact cement gun in patching honeycomb and filling up voids. From all indications, this method of making repairs is very effective.

The first picture shows a Bondact gun in action on a bridge on FM 1021 in Eagle Pass. The next three pictures show columns after treatment with this gun which completely obliterated all badly honeycombed areas. The fifth picture was made in an attempt to show repairs made to an end post of a railing which had been damaged and brought back to its true section with this gun. By the use of this equipment in repairing spalled surfaces, it is not necessary that any form work be constructed.

This equipment was used some years ago when a large area of sandstone was plastered with mortar at the side of a bridge over the Guadalupe River on State Highway 29 near Hochheim.

The south pier of this bridge was resting on a rather soft deposit of sandstone which was being badly eroded by the current of the stream. It appeared that unless the erosion was stopped there might be an ultimate failure of the base supporting the pier. The entire ledge of sandstone was covered with a cement mortar, and has apparently completely corrected the condition.

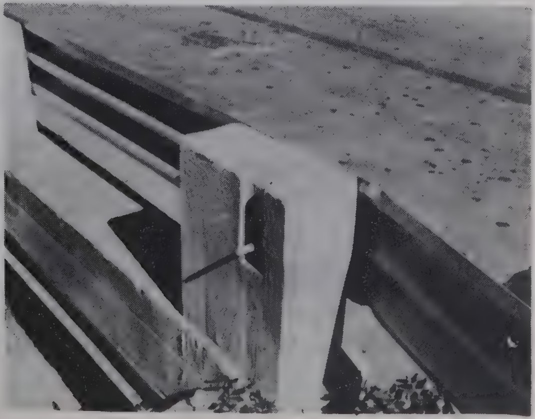
■Bondact gun in action on a bridge


■Column after treatment with bondact gun

■Honeycomb areas have been obliterated

■Another column repaired by bondact gun

■Repairs made to a damaged post end of a railing which brought it back to its true section.



Camp Hubbard Shops

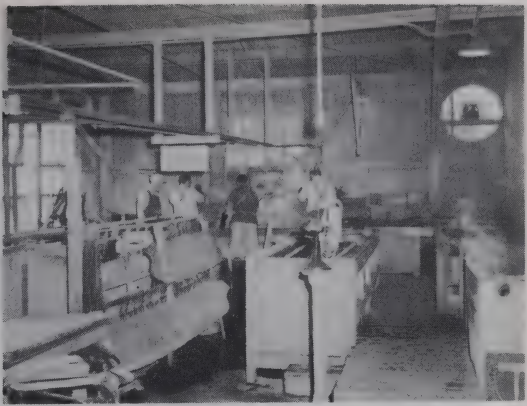
Equipment and Procurement Division

The face of Camp Hubbard shops is changing rapidly these days. Where once we maintained a beautiful lawn and shrubbery, steel piling is now stocked which is just about keeping our bridge construction going these days.

Camp R. M. Hubbard shops were originally intended to be the main shops and warehouses for the Department, but the Department has long since outgrown this type of operation. We now have complete shop and warehouse facilities in each District. At the present time Camp Hubbard shops have a very important special part in our overall operation. Here we fabricate, plate, and process all of the steel sign blanks used in our sign work throughout the State. We also stock enormous quantities of special paint as well as more than 300 other special items. All special equipment such as core drills, nail pickers, and the like, are operated out of Camp Hubbard shops.

Our shop work is limited to specialized work, such as the maintenance and construction of special laboratory equipment, testing machines, the repair and renewal of instructments, etc.

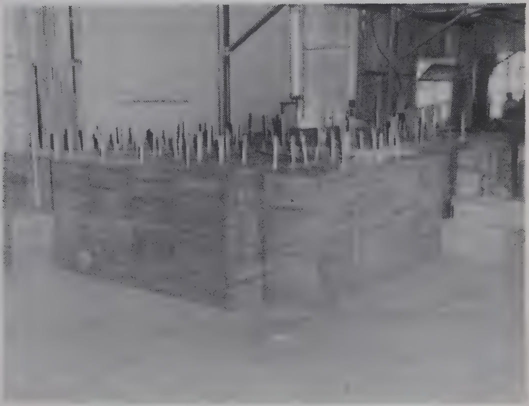
Steel piling stock and crane.



Sign plating plant in operation.

The three men who make Camp Hubbard shops go: Left to right: R. W. Townsley, general superintendent, operations; Claude Evans, instrument repair; and C. J. Collin, warehouse stock.

One of the new storage sheds recently built.



Part of sign plate stock.

Modifications of Maintenance

Barricade Type "G"

Traffic Services Division

An exceptionally large number of accidents have occurred on our highways recently resulting from motorists running through and around barricades and striking maintenance employees working on the paved surface of the road. In an effort to remedy this situation Austin Divisions D-3, D-16, D-18, and D-20 with the cooperation of District 14 have proposed a standard pattern of signs and barricades for maintenance work, the details of which may be found in Construction and Maintenance Circular Number 8-50.

The Type "G" barricade shown in the above mentioned circular is identical with the one shown in the sign manual with the exception of its color and direction of slope of the stripes. The yellow and white stripes have been changed to black and white, and their direction of slope is the same for all three boards. The barricade shown in the manual is supported on three legs, two of which are flush with the back of the stripe boards and a third one that extends from the center backward and out to form a tripod. This barricade was tested during a rather high wind (estimated at 25 to 35 m.p.h.) and much difficulty was experienced in keeping the barricade in place. It would either blow down or shift its position on the pavement. Several alternate designs were considered in an effort to correct this, but the one described in the following discussion was decided upon as being the more satisfactory. Several of them were constructed by District 14 and biven a rigid test in a high wind. They proved to be much more stable than the barricade with tripod legs.

The design was modified by substituting one leg at each end of the barricade and extending backward and out instead of the one leg attached at the center. When the barricade is unfolded, it is kept in an upright position by means of strap hinges at each end of the barricade (see Figure No. 1). When not in use, it can be folded up (see Figure No. 2). When in this position it can be hung on a truck by the metal straps which are provided for transportation from one location to another. Figure No. 3 shows the position of the barricade when in use.

Both the "Advisory Speed" sign and the "Arrow" sign are held on the barricade by metal straps.

Figure No. 4 shows the "Arrow" sign and how the metal straps are attached in order that the arrow may point in any direction desired.

Figure No. 5 shows Type "C" barricade, and Figure No. 6 shows Type "E" barricade. Both of these barricades were constructed as referred to in the above mentioned Construction and Maintenance Circular Number 8-50.

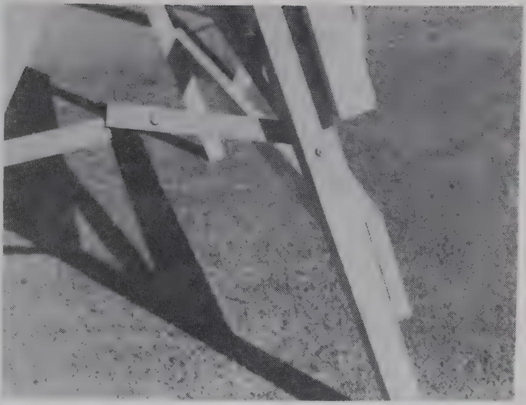


Figure 1

Figure 2

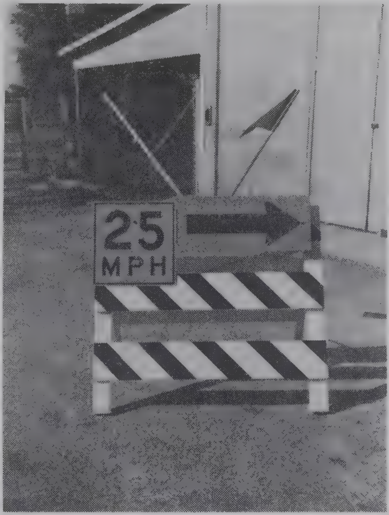


Figure 3

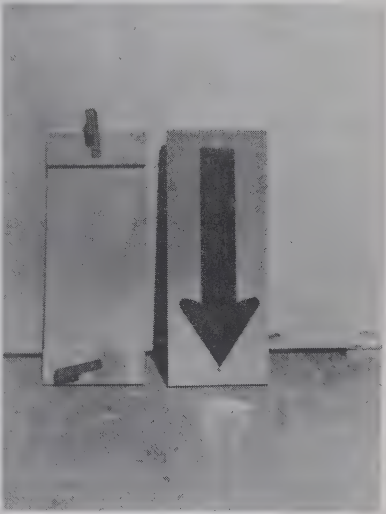


Figure 4

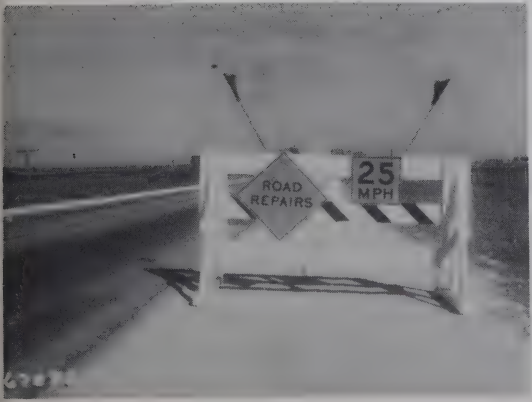


Figure 5

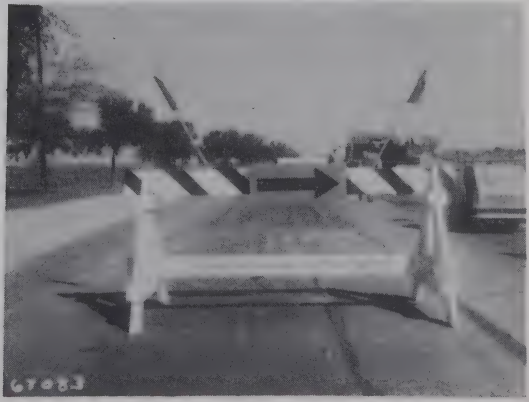


Figure 6

ASPHALTIC SEAL COATS

J. C. ROBERTS, *Assistant District Engineer*

A concentrated study for the improvement of seal coat work in District 8 of the Texas Highway Department was started in the summer of 1939, and was brought about by the assignment of Mr. S. J. Treadaway as District Engineer. Prior to that time very little seal coat work had been done on the existing four or five hundred miles of asphalt roads. Seal coat work commanded very little importance, and naturally, was considered a "cut and dried procedure." Experienced asphalt engineering personnel was not considered essential to the successful completion of the work and usually consisted of only the necessary checkers to measure the amount of the contractor's daily production. Naturally, with this attitude, the asphalt surface after sealing gave the effect of "having happened," rather than having been well planned and supervised by competent engineering personnel.

Because of the wide range of climatic conditions; that of very severe winters on the one hand and very hot summers on the other extreme, plus what might be termed a semi-arid area, experience taught us that to properly maintain asphalt surfaces, and to insure against base failures and other deformities in the pavement, we should seal our asphalt surfaces on an average of four or five years. If this policy of maintenance were to be followed, it meant to us that from 200 to 300 miles of our asphalt surfaces would necessarily have to be sealed each year in order to keep abreast of the problem. That amount would increase as newly constructed roads added more miles of asphalt pavement to the highway system in the district.

It was evident that such factors as weather, type and size of aggregate, type and grade of asphalt, together with type and volume of traffic under usual design and construction procedures, gave us as many different patterns of completed surfaces as there are changes and combinations in all of the above factors.

There was no doubt then that much improvement could be made and must be made in the quality of seal coat work in the district. With this in mind, Mr. Treadaway has been continuously insistent that every possible means be used to improve this work. It was the consensus of opinion among the engineers working in the district that the desirable characteristics of a completed asphalt seal coat should consist of four chief characteristics:

1. It should provide a durable protection to the old pavement from surface water, sunlight, and air.
2. The completed surface must be safe to the traveling motorist during all types of weather, and it, therefore, must be non-skid.
3. All seal coat work placed under the same specifications and under the same construction procedures should have a uniform texture and color.
4. During the construction and maintenance period, the traveling motorist should be subjected to the minimum amount of inconvenience, and if possible, be free from the hazard of flying cover stone.

Any asphalt surface in need of the first two factors, namely that of protection to the surface and base and the elimination of slick pavements, would justify the expenditure for a seal coat.

It was not unusual to hear such comments by our engineers after failure to secure the desired results on penetration asphalt work: "This procedure gave us a good job on Highway Number 1. Why should it not give us a good job on Highway Number 2?" It was not uncommon to hear maintenance personnel describe a newly placed seal coat in this manner: "The new seal coat is bleeding." "Cover material is flying, breaking windshields and headlights." "The road is going to be slick." Buy some more cover material on emergency purchase." "Blade or broom the cover material from the shoulders of the road." "It looks like we will be working on this seal coat the rest of the summer." "Can't do anything to regular maintenance because we have to take care of a new seal coat." "We have spent more money in an effort to cure the new surface than the original cost." And a comment from a traveling motorist would be this: "Let's detour that road. I had rather drive a hundred miles than take my car through that new asphalt job." Sometimes, this story continues the following summer on the same project. Please bear in mind that these are our particular experiences and comments made in our area during the last eleven years.

The cost of two of the above items, namely broken glass and slick pavements, cannot be accurately estimated. A tabulation of all comprehensive items from glass breakage on automotive vehicles from all the insurance companies plus the expense by users of the highways for damage which was not insured, would give you the cost of flying stone on newly placed asphalt seal coat work. The subjection of the traveling public to slick pavements during wet weather should be prohibited. It is our opinion that a condition of this kind should be corrected and given precedence to any other type of work pertaining to the construction and maintenance of our highway system. The cost of slick pavements to the traveling motorist can be measured only by property damage, personal injury, and death to the users of our highways.

It is possible that if steps are not taken to eliminate these objectionable features that the users of our highways will so vigorously object to these conditions that on some roads the use of seal coat would be prohibited.

It is our considered judgment that experienced engineering personnel should be assigned to the study of the problem of improving the design and construction procedures now being used on penetration asphalt work. The plans, specifications, and construction procedures should be so exacting that the best of mechanical equipment would be furnished by the contractor on work of this type, and further that skilled operators for this equipment should be available at all times.

As stated in the beginning, the design and construction procedures now in use on seal coat work in District 8 of the Texas Highway Department have evolved from many trials of combination of materials and uses of equipment. For that reason it is appropriate to discuss some of the factors that influence the design and construction of a satisfactory asphalt seal coat.

1. Selection and Grade of Asphalt Material to be Used: Manufacturers of asphaltic materials are usually able to satisfy the desire of the engineers working in the varied climatic conditions of the country. Engineers have learned through experience and by laboratory testing which type of asphaltic cement gives the best results in their particular area. Generally, the consensus of opinion is that lower penetration asphalts are suitable for hot, humid areas. Rapid curing cutbacks are adapted to the cooler climates. The rapid breaking, high viscosity emulsions can be favorably used over a broad range of climatic conditions. The choice of any asphalt material should be seriously considered by the designing engineers and its selection should be based on performance of this material in their particular area. They must consider type and volume of traffic, the condition of the old surface, and type and quality of cover material which will be on hand for use.

2. Quantity of Asphaltic Material Required: The quantity of asphaltic material required, that is, the rate of distribution, is certainly a factor which would influence the result of any type of asphalt work. Since the state of deterioration on the old surface governs the need of seal coat, each may require a different rate of application. Rough textured surfaces which are raveling will necessarily require heavier application because of some absorption of the materials by the old surface.

I am sure that each of you has observed that a change from a rough surface to a smooth, slick surface may occur many times within the limits of one project. Variation in the rate of application of asphalt should be made in accordance with these changes. Whether it be a problem of seal, color coat or slick pavement, the texture of the old surface would certainly govern the rate of application of asphalt. Perhaps the most important factor of all in making this determination is the maximum size of the cover material to be used and how this cover material is to be manipulated before it is embedded into the asphalt.

3. Aggregates: With the wide range in gradation and quality of aggregate now being used on penetration asphalt work, the word aggregate has come to mean most anything. It goes without saying that engineers have one preference for a particular type of aggregate which is available for use in their particular area, but the economics of the problem which is always a factor makes it necessary for them to use many types of aggregate. Allowance always must be made for the physical characteristics of the aggregate to be used. The experienced engineer will be thoroughly familiar with these various characteristics. Some of the common types used are: screened gravel, crushed gravel, and crushed rock of which there are many geological types of this classification; crushed limestone and lean limestone rock asphalt. In some localities precoated aggregates are available for city work where it is highly desirable to eliminate the hazard and nuisance of dust. It has been our experience that the selection of gradation and the maximum effective size of the cover aggregate has a greater bearing on the results desired than any other factor in the placing of an asphalt seal coat.

To intelligently select the size and gradation of the aggregate, the manipulation and procedure of placing the aggregate on the road must be carefully planned in advance. It is all important that the selection of maximum effective size gravel and gradation be in keeping with the rate of application and type of asphalt. It has been our observation both in maintenance and construction work that the maximum effective size of the aggregate should be such that the aggregate will extend through the asphalt surface after the curing period to such an extent that traffic will be just riding on the maximum size aggregate rather than in the asphalt. Our experience with many types of aggregate and varying screen analyses from fine to coarse has shown that material passing the ten mesh sieve should be excluded from the aggregate as nearly as possible.

4. Construction: You will agree that the construction methods used in placing penetration asphalt work can either make or break a satisfactory job. Here, again, let it be emphasized that experienced engineers and inspectors are worth their weight in gold to the final results of an asphalt seal coat. It is believed that a description of the various inspections and procedures now being carried on in District 8 of

the Texas Highway Department would best give you a picture of what we have in mind. Immediately after the arrival of the contractor's equipment on the project, competent asphalt inspectors check the equipment to see if it is in proper working order. Naturally, one of the most important pieces of equipment is the pressure type distributor. First, the distributor should be mounted on a truck which is large enough to satisfactorily carry the load and with power enough to start the load at the beginning of the shot and to gain immediately and hold a predetermined rate of speed. Second, the truck should have such braking capacity as to permit it to stop on a thirty inch lateral paper at the end of the shot. The distributor must be equipped with a tachometer which indicates the revolutions per minute of the distributor motor. The truck must be equipped with a tachometer which indicates the feet per minute traveled by the truck. Naturally, a coordination of these two gives you uniform application of asphalt.

Prior to placing the asphalt, an inspection should be made inside the distributor in order to determine if any coke deposits have formed inside the tank due to previous use as a heating unit. Most modern distributors are equipped with screens which gather any foreign materials and eliminates the possibility of such particles getting into the spray bar and nozzle. Cleanliness inside a distributor usually means good work with a distributor. All connections relative to the plumbing of the distributor should be checked for leaks. If the inspecting engineer is not familiar with the manufacturer's recommendation as to the operation of the machine, he should ask the contractor to provide him with their recommendations.

Next, all the nozzles on the spraybar should be checked for uniformity both as to the size of the orifice and as to the angle setting with relation to the spraybar. Usually, the recommendations of the manufacturer can be followed very closely in regard to the height of spraybar or nozzle tips above the pavement. This is very important and may be the cause for streaking or irregular application. It has been our experience that overland transportation of an asphalt distributor from one job to another will in many cases get it out of adjustment. Periodically, during the construction of the job the same steps should be taken to see that everything is in order.

Experienced, conscientious operators are, of course, necessary for the proper operation of an asphalt distributor.

Where a usual volume of production is expected by the contractor, he will necessarily have sufficient asphalt storage and suitable asphalt heating equipment. There should be attached to the heating unit, as a precautionary measure, and as prescribed by the manufacturer, a recording thermometer which would give to the engineer the range of temperature to which the asphalt has been heated.

An aggregate spreader in satisfactory working order should be provided by the contractor together with very experienced operators. It has been our experience that in the successful operation of the cover crew one man should back the truck which is unloading into the spreader box, as it is almost impossible for a number of truck drivers on any particular project to develop the technique necessary to give an accurate and uniform coverage with the spreader box.

Satisfactory loading equipment to handle the cover material should be provided by the contractor. Usually, this piece of equipment does not present much of a problem to the engineering personnel, as the contractor must provide adequate loading facilities for the cover material. The necessary drag brooms, rotary brooms, pony blades, and incidental equipment should be readily available at all times.

There are many more detailed checks that should be made that are essential before the asphalt work is started such as:

1. Clean pavement.
2. Line guide.
3. Accurate and uniform loads of aggregate.
4. Stone spread lengths.
5. Predetermined length of shots.
6. Accurate calibration of distributor tank.
7. Provision for traffic.

After all checks have been made of the contractor's equipment and personnel, the engineer's inspectors are then given their various assignments. In the beginning of this paper, it was brought out that there were four main objectives which we decided to accomplish by placing a seal coat. Namely, to seal the pavement; to produce a non-skid surface; to obtain a uniform texture and color; and to eliminate the hazard of flying cover stones. Our study and experience have proven to us that asphalt cements with penetration grades of 200 to 300; penetration grades of from 150 to 200; and penetration grades of 120 to 150 give us the best results when they are applied under conditions which are best suited for each of these grades.

In our area there are four different types of aggregates which are satisfactorily being used. Namely, screened silica gravel; screened limestone gravel; crushed limestone; and lean rock asphalt. In order to accomplish our four objectives it is the consensus of opinion that the following screen analysis gives us the results desired:

Retained on the 3/4" screen	0%
Retained on the 1/2" screen	25 to 50%
Retained on the 10 mesh screen	95 to 100%

varies. In our area, usually this application varies from 0.25 gallon per square yard to 0.35 gallon per square yard.

As is common practice all asphalt shots are started on lateral paper and stopped on lateral paper in order that there will be no overlap at the joints. Immediately after the asphalt is placed the cover material is evenly spread with a mechanical

This analysis is based on the use of round openings in the screen.

Inasmuch as the retainage on the

1/2" screen is the controlling feature of this analysis, a wide variation of the pattern of cover material could be furnished under this specification. Therefore, it is only logical that the rate of asphalt application should be varied as the pattern of aggregate changes. Changes in the application of both asphalt and aggregate will be necessary as the texture and condition of the old pavement type spreader at the rate of approximately one cubic yard of cover material to 90 square yards of pavement. This application of cover material is dependent upon the rate of application of asphalt and the amount of material retained on the 1/2" screen. To say this another way, with this application of rock and the above screen analysis, we strive to obtain an application of stone one rock deep. We have found that it is almost axiomatic (that the less cover material placed, the more cover material we will stick). Each man, both the contractor and the engineer, strives to get a better distribution of aggregate as the job progresses. In fact, at the above rate of application of stone the utmost care must be taken with the cover material or else all of the asphalt will not be covered.

You will remember that one of our objectives was to eliminate the hazard of flying cover material, and contrary to the belief of many engineers we believe in extensive rolling of cover stone. Whether you be from the country or from the city, everyone knows that the time to brand a calf is while the branding iron is hot. It is our opinion that the time to embed cover material into a membrane of asphalt is to do it while it is hot.

Our current seal coat in the district consisted of approximately 210 miles. We did not have flying cover material. We had at our disposal at all times immediately behind the spreader box five steel wheel rollers, with a manufacturer's rated weight of from seven to ten tons. A tabulation of our records show that the entire surface of our seal coats are covered on an average of twenty-five times with the steel wheel rollers. Complementing the steel wheel rolling sufficient pneumatic tired rollers are used to bring the asphalt near the surface. The completed seal coat is thereby accomplished in one day with the exception that the following morning a rotary broom is used to sweep the pavement clean of any loose material that might have been able to stay on the road and not be embedded in the asphalt. It is estimated that after this procedure has been completed there is less than two per cent whip-off.

Yes, we crush some of the larger particles of cover stone. We have not found this objectionable to any extent whatever. You will please be reminded that in the above operations no mention was made of any manipulation of the aggregate after it goes through the spreader box. We refer to the usual procedure of brooming, blading, or both, prior to rolling. Our experience has demonstrated that about all you get out of this operation is the loss of the larger size particles as whip-off. In fact we think the operation does more harm than good.

It is our theory that if a definite pattern of an aggregate is specified by screen analysis, then that same pattern should be indicated by the screen analysis of that material embedded in the asphalt on the road. In our minds, the greatest help that could be given the placement of penetration asphalt pavement would be self propelled, rigidly controlled mechanical spreader which would obtain the same degree of accuracy in spreading cover material as we are now able to obtain with present day distribution in the placing of the asphalt.

While the work is in progress, intelligent, well informed, neat appearing and courteous flagmen should be placed ahead of the operation and at the beginning of the day's operation, asking traffic to drive cautiously through the limits of the construction operation. Flagmen should be so dressed or otherwise identified that he be able to attract the attention of the traveling motorist and indicate to him that he will guide him safely through the hazard involved. So often, the flagmen do not meet a very high standard of qualification. It seems that we fail to remember that the flagmen make more contacts with our customers, the traveling motorists, than perhaps any other man in public work.

In Texas each passing motorist is handed a courtesy card by the flagman which reads as follows:

> ***Please Drive Carefully***
>
> You are entering a section of road under construction.
> Watch for uncovered asphalt and flying stone.
> Please do not pass the car ahead.
> We are performing this work without causing you to travel additional miles on a detour.
> The inconvenience is regrettable, but we believe you would prefer this method.
> The Highway Department is spending $6,000,000 on this type of repair this year in order to keep our roads of a modern standard.
>
> *Thank You,*
> TEXAS HIGHWAY DEPARTMENT

Gentlemen, we have found that careful study in the planning and design stages, good judgment in the application and use of asphalt and rolling to the extent we have described will embed the aggregate into the asphalt so that we will obtain the four desirable characteristics, namely, to provide a seal; to make the pavement non-skid, to secure a uniform texture and color, and to eliminate the hazard liability of flying stone.

With this procedure, we have in the past two seasons sealed approximately 500 miles of road. Bleeding has been negligible, and no expenditure has been necessary for cover material or maintenance during the curing period. In other words, with this procedure we have in effect been able to build a seal coat with characteristics one year old in one day.

There are possibly two objections to the methods and results obtained by this procedure.

1. Rolling costs money.

May we say that broken windshields, wrecked automobiles, personal injuries and fatalities also cost money.

2. Some critics will say that the coarse texture of the surface causes a rumbling noise under

traffic. This is true for the first season. After that it is so minimized that the rumbling is not objectionable. This noise can further be reduced by still more rolling. Perhaps you gather by now that we believe in rolling aggregate into the asphalt while the iron is hot.

I have available here slides that will show the various operations during construction and the texture and appearance of the completed work.

Presented at the Asphalt Conference in Oklahoma City on Nov. 3, 1950

TWENTY-FIVE AND THIRTY YEAR AWARD WINNERS IN NOVEMBER

Front row: Marvin Raney, H.O. Rouse, C.A. Tolson, Mrs. Elizabeth Turpen, Freda Swiedom, Rena Reynolds, Refugio Guerra, and A.D. Hutchison.
Middle row: H.D. Trussell, F.B. Ogle, F.S. Maddox, Thomas A. McBride, O.P. Owens, O.F. Henderson, M.C. Welborn, and J.M. Middleton.
Back row: R.F. Burns, M.P. Homeyer, Herbert Eldridge, L.A. Fletcher, D.L. Hogan, H.L. Kilbourne, Albert Lane, and Herschel Brown.

Field Tests for Traffic Paints in Austin and Vicinity

TRAFFIC SERVICES DIVISION

On September 26 and 27, 1950, various commercial traffic paints were applied in the field for the purpose of obtaining a comparison as to their durability, day and night visibility, and ease of application. The experiment is being conducted by the Division of Traffic Services and the Materials and Tests Division. District 14 labor and equipment were used for the striping operations.

Two test locations were decided upon. One selection was the east half of Lamar Boulevard between Forty-second and Forty-third streets. This is a four lane undivided boulevard with a hot-mix asphaltic concrete surface and a traffic count of 10, 160 vehicles for all four lanes. The other selection was the south half of State Highway 20 about one-quarter of a mile west of the East Avenue intersection with Highway 20. This is a two lane highway with a hot-mix asphaltic concrete surface and a traffic count of 3, 411 vehicles for both lanes.

Before any of the test paints were applied, a thorough check (by trial runs) of the paint machine was made to determine the approximate rate of application of both the beads and paint. The paint machine was a self-propelled Kelly-Creswell, Model B-3-P. In order to facilitate application of the paints, a special three gallon paint tank was built. This tank was fastened to the paint machine by means of brackets, and the paint and air lines used were the same as those used on the main tank. The main tank was disconnected during the test operations. As cleaning of the tank was necessary after each paint was applied, the use of this smaller tank was of great value during cleaning operations.

For each type of paint used, a thin metal plate (same size as a car license plate) was weighed and given an identification letter to correspond with the paint used. When the paints were later applied at the test locations, these plates were placed on the pavement surface and sprayed as the paint machine laid the regular stripes. From these painted plates, the film thickness of each paint was determined by both weight and actual measurement.

Preliminary to laying the stripes, the location of each stripe was marked by means of a chalk line. Three stripes of each type of paint were laid side by side and spaced on 18" centers. The spacing between the different types of paint was 36". The pavement surface was cleaned with brooms, and barricades, signs, and flagmen were used to keep traffic off the freshly painted stripes.

The first stripe placed at each location was given the identification letter "A", the next "B", the next "C", etc. These letters were painted in red beaded paint on the pavement at the end of the stripes. Traffic was not allowed on the stripes until one hour and a half after the last stripe was placed.

All of the paints used were yellow in color and reflectorized. Some of the paints came with four pounds of beads incorporated, to which two additional pounds were added on top at the time of application. To those paints which had no beads incorporated, six pounds of beads were added on top at the time of application.

Listed below are the various manufacturers whose paints are included in this test:

1. Texas Paint and Varnish Co.
2. Kuhn Paint and Varnish Co.
3. Gulf States Paint Co.
4. Dixie Paint and Varnish Co.
5. Bute Paint Co.
6. Prismo Safety Corp.
7. Minnesota Mining and Manufacturing Co.
8. Texas Highway Department Specification YP-7
9. Formulation by the Diamond Alkali Corp.

Inspections of at least once a month are being made. These inspections consist of visual observation and day and night photographs of all stripes. The night photographs are taken from the side of the road parallel to the longitudinal axis of the stripes (normal to the center-line of the roadway). Three stripes of each paint are included in each photograph. The day pictures are close-ups of each stripe. From these visual observations and photographs, the condition of the stripes with regards to wear, asphalt bleeding, night and day brightness, and cracking will be determined. Impartial observers who will not know the identity of any stripe are being used to rate the characteristics and condition of the various paints. Their ratings are based on the following:

10) Perfect or absence of failure

9)
8) Good or slight failure
7)

■Striping machine applying test stripes

■Lamar Boulevard stripes

■Night photograph of stripes on State Highway 20

6)
5) Fair or intermediate failure
4)

3)
2) Poor or bad failure
1)

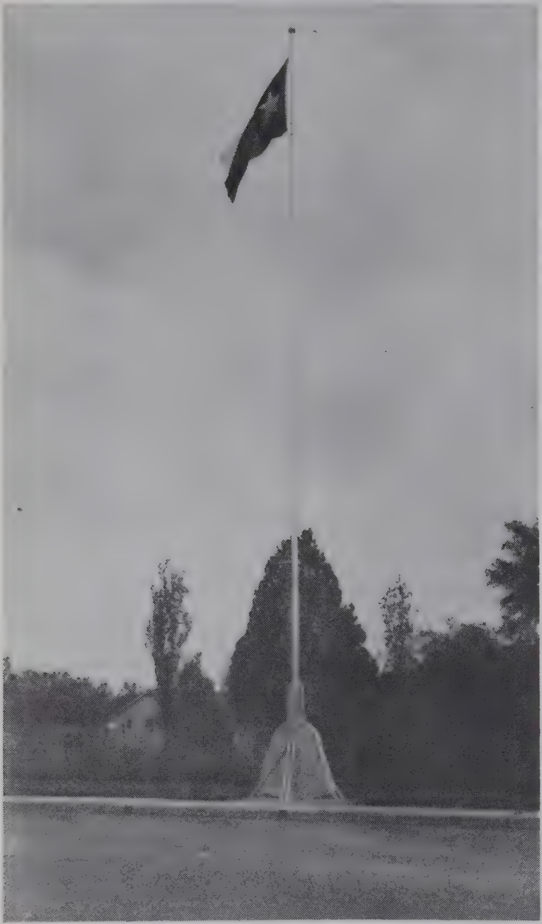
0) Very poor or poorest degree conceivable or complete failure

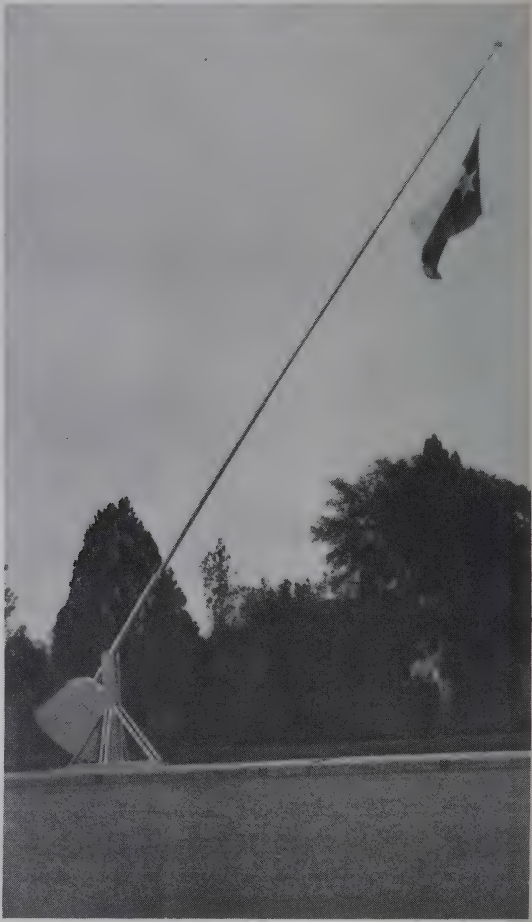
At the present date (forty days after application) three of the stripes are showing signs of failure. The stripes on Lamar Boulevard are showing more wear, due to the heavier volume of traffic.

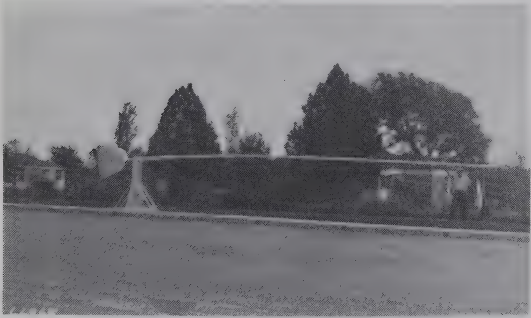
When tests have been completed and the results are known, the information will be circularized for use within the Highway Department.

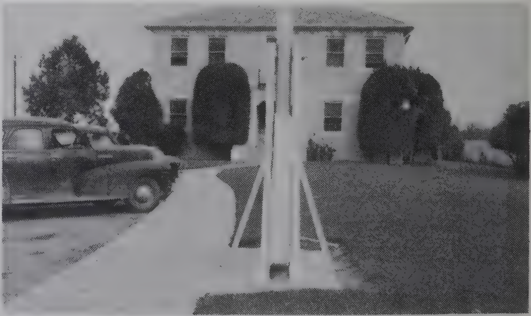
"There was a yellow light just before a green with two little green arrows and then a flash of yellow again, a red, a honk, and then this whistle blew WHEEEEeee and ----- "

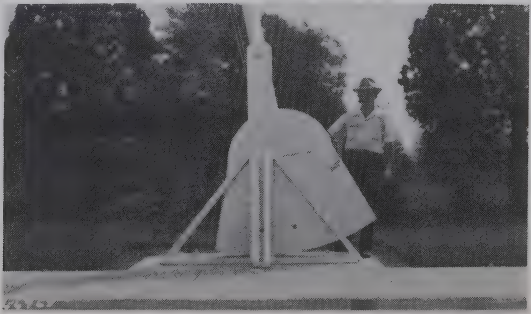
THE FOLLOWING PICTURES AND SKETCH SHOW THE COUNTERBALANCED FLAGPOLE IN USE AT DISTRICT 14 HEADQUARTERS

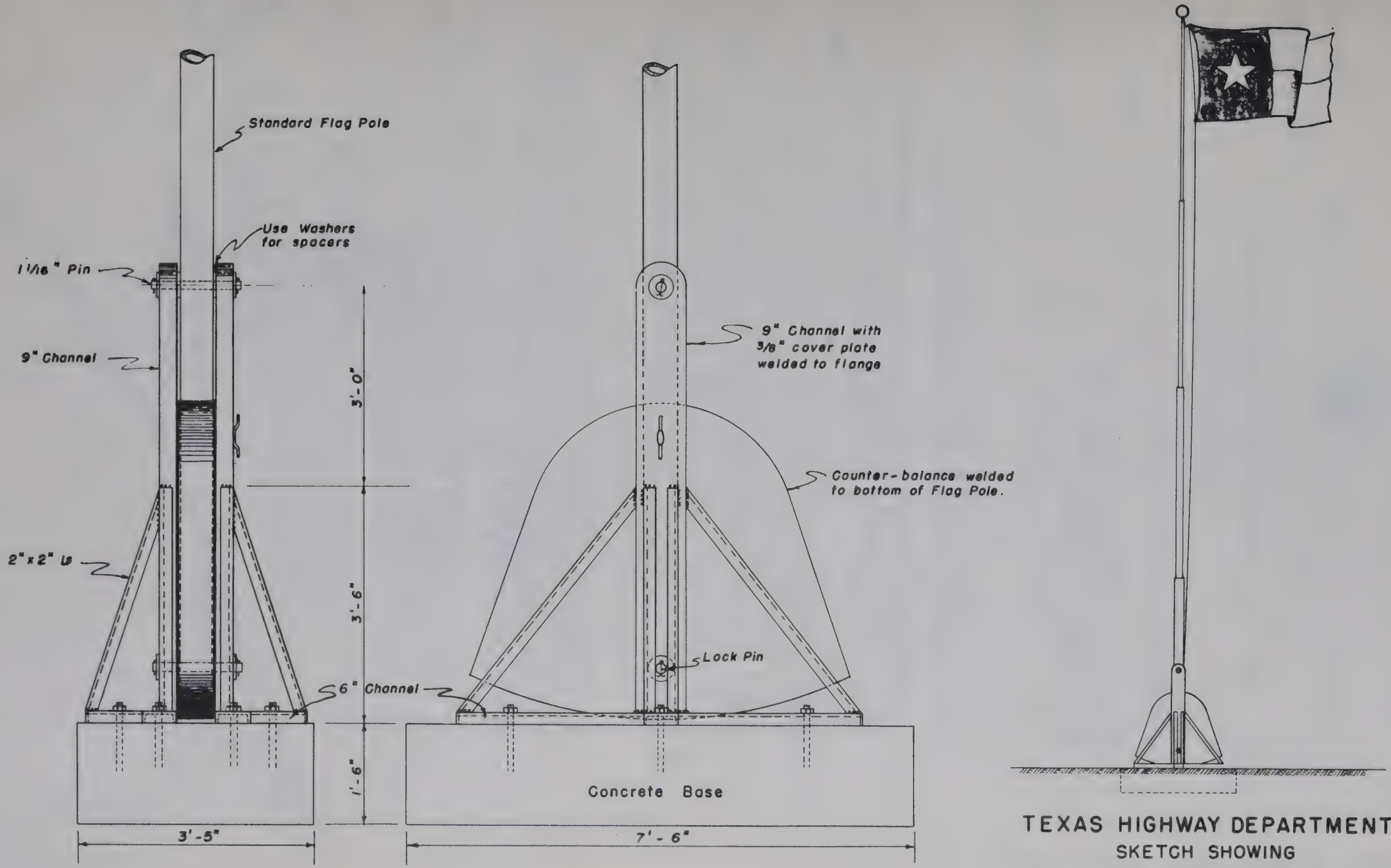












TEXAS HIGHWAY DEPARTMENT
SKETCH SHOWING
FLAG POLE COUNTER-BALANCE

COMMISSION

FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT

STATE HIGHWAY ENGINEER
D. C. GREER

Lufkin, Texas
December 20, 1950

Personal

FILE NO.

Mr. John B. Nations
Director, Equipment and Procurement
State Highway Department
Austin 14, Texas

Dear John:

Reference is made to your request for my ideas in regard to a preventive maintenance program for our major equipment.

I am enclosing a form which we have used and found to be very helpful to the District Shop and Maintenance Foremen in preventing major repairs. Periodic inspections are made of each piece of equipment, and 2 copies of the Inspection Report prepared. One copy is given to the Maintenance Foreman and the other filed in the District Shop. This procedure informs the Maintenance Foreman of the repairs needed by his equipment, whether minor or major, and also informs the District Shop of the repairs that are to be made at an early date. When the necessary repairs are made, these reports are filed for future reference until the next inspection is made on this same equipment. The sample form attached covers only trucks and automobiles, but it can easily be revised to cover any and all equipment.

My idea of a preventive maintenance program is more than inspecting equipment and performing minor repairs. I think we should have a man capable of instructing our Maintenance Foremen and equipment operators on the importance of the proper operation and care of our equipment.

I think the above information will give you a rough idea of how we have put preventive maintenance into operation in this District. If additional information is desired, please do not hesitate to call on us at any time.

Very truly yours,

V. G. Koch
District Engineer

By: L H Hubbert

L. H. Hubbert
Equipment Supervisor

LHH:jp

PM FORM USED IN DISTRICT 11 . . .

Equip. No. Make	License No. County
Condition of Motor:	Condition of Tires:
	Condition of Radiator:
	Front Axle & Steering:
U Joints and Drive Shafts:	Condition of Brakes:
	Condition of Battery:
Rear Axle & Differential:	Date of Inspection & Mileage:
Remarks:	Equipment Supervisor

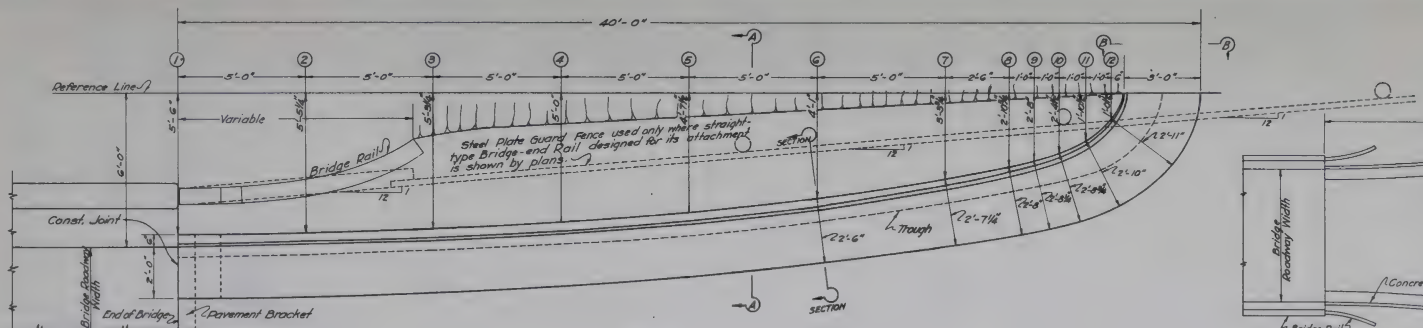
BRIDGE APPROACH CURBS

CLYDE SILVUS, *Bridge Division*

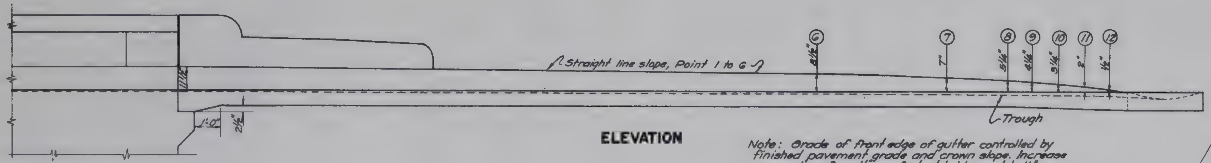
Bridge approach curbs serve two useful purposes. They carry drainage away from bridge ends and header banks, thus reducing maintenance costs and they help to channel traffic onto restrictive roadway bridges, thus eliminating the blunt end of bridge curbs which are a frequent source of accidents. Photographs below show restrictive roadway bridges with and without approach curbs.

Most bridges constructed during the past few years have been provided with the approach curbs and to make them fully effective grass and weeds obstructing their view should be removed.

There are a number of restrictive roadway bridges on the highway system which do not have the approach curbs. For those restrictive roadway bridges which have a roadway width adequate for the existing traffic and such bridges that are almost adequate in roadway width and which must serve without widening for a number of years, we recommend that bridge approach curbs, conforming to the standard BCF-41 shown below, be constructed by maintenance forces.

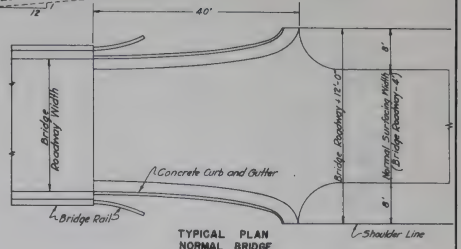


PLAN

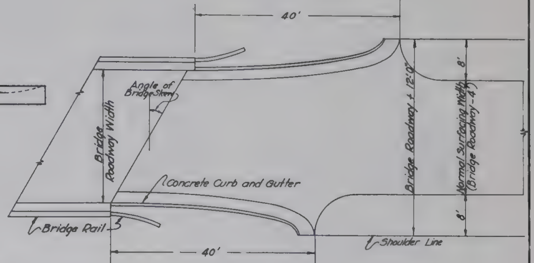


ELEVATION

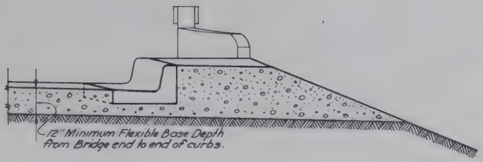
Note: Grade of front edge of gutter controlled by finished pavement grade and crown slope. Increase crown slope from ⅛" per foot at bridge end to ¼" per foot at point ⑥ and beyond.



TYPICAL PLAN NORMAL BRIDGE

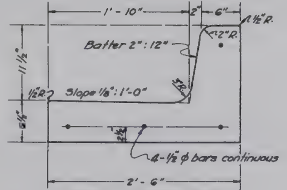


TYPICAL PLAN SKEWED BRIDGE

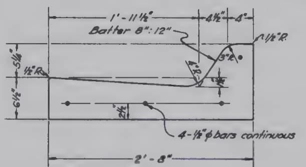

12" Minimum Flexible Base Depth from Bridge end to end of curbs.

SECTION A - A

Curb shall be constructed on a compacted course of Flexible Base. Fill behind curb shall be of flexible base material unless otherwise required by plans.

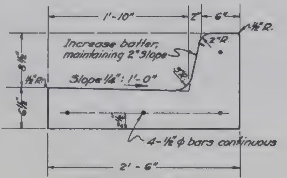


SECTION AT BRIDGE - END

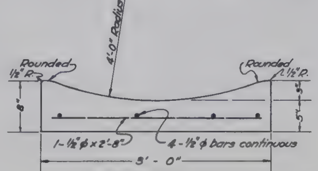


SECTION AT POINT 8

Note:
Decrease curb-top width and increase curb-front batter from Point 8 to end.



SECTION AT POINT 6



ELEVATION AT B-B

GENERAL NOTES:

The cost of all excavation required for the construction of curb and gutter and the furnishing and placing of the reinforcing steel shown shall be included in the unit price bid for "Concrete Curb and Gutter."

The length of Curb and Gutter for payment shall be the over-all length, i.e., 40'-0" for each section of curb.

TEXAS HIGHWAY DEPARTMENT

BRIDGE APPROACH CURBS

FOR USE WITH FLEXIBLE TYPE PAVEMENTS

APPROVED	STATE HIGHWAY ENGINEER	DATE 1-22-42

REVISIONS

DATE	DESCRIPTION	BY	APPROVED
Sept 9 '41	Omit Reflector Buttons	WRD	

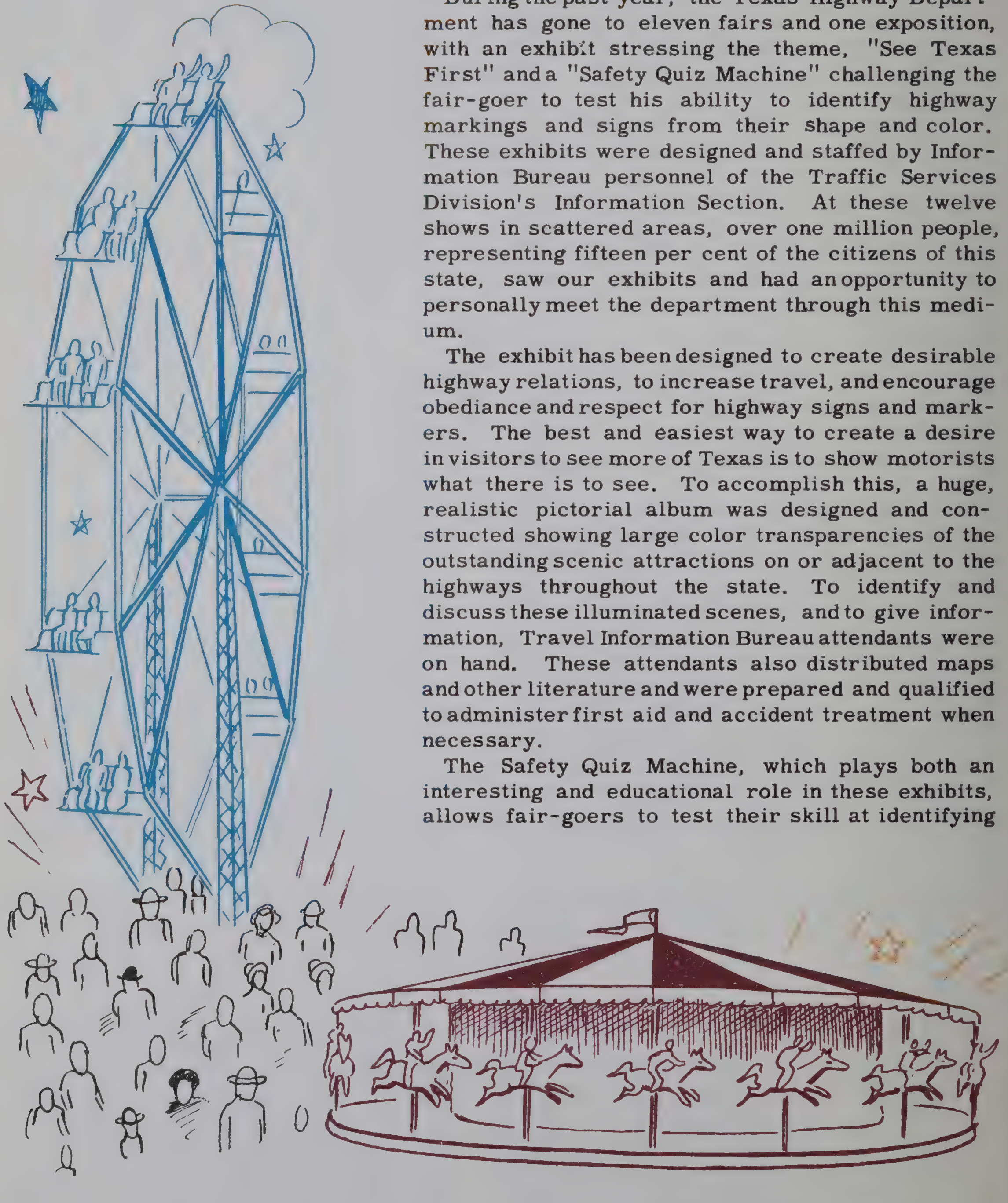
BCF - 41

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
6	TEXAS		32

STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.

HIGHWAY AT THE FAIR

Traffic Services Division



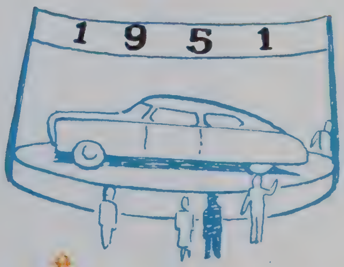
During the past year, the Texas Highway Department has gone to eleven fairs and one exposition, with an exhibit stressing the theme, "See Texas First" and a "Safety Quiz Machine" challenging the fair-goer to test his ability to identify highway markings and signs from their shape and color. These exhibits were designed and staffed by Information Bureau personnel of the Traffic Services Division's Information Section. At these twelve shows in scattered areas, over one million people, representing fifteen per cent of the citizens of this state, saw our exhibits and had an opportunity to personally meet the department through this medium.

The exhibit has been designed to create desirable highway relations, to increase travel, and encourage obediance and respect for highway signs and markers. The best and easiest way to create a desire in visitors to see more of Texas is to show motorists what there is to see. To accomplish this, a huge, realistic pictorial album was designed and constructed showing large color transparencies of the outstanding scenic attractions on or adjacent to the highways throughout the state. To identify and discuss these illuminated scenes, and to give information, Travel Information Bureau attendants were on hand. These attendants also distributed maps and other literature and were prepared and qualified to administer first aid and accident treatment when necessary.

The Safety Quiz Machine, which plays both an interesting and educational role in these exhibits, allows fair-goers to test their skill at identifying

highway signs by their shape and color, while at the same time, making them more aware of the meaning and importance of our markers. The design of this display is a "take off" on the pin ball machine idea, offering twelve of the more important signs in actual color and shape with an explanation which is either true or false. The trick is to determine whether the question selected is true or false. If the correct answer is guessed, a chime is heard, but if the incorrect answer is indicated, then simulated raspberries are heard. The average person can only identify 75 per cent of our signs from their shape and color. However, much better grades were made by the fourteen to sixteen year old group, who are either preparing for or have just taken a driver's license exam.

Last year Texans spent a total of $315, 506, 000 on all types of recreational intrastate travel. This year, and next, we hope to see a greater increase in motor travel, which will mean an increase in our tourist industry revenue. We feel that as a result of our exhibit work and other material distributed, a greater desire to travel within the state and the idea of "See Texas First" have caught on throughout the state.

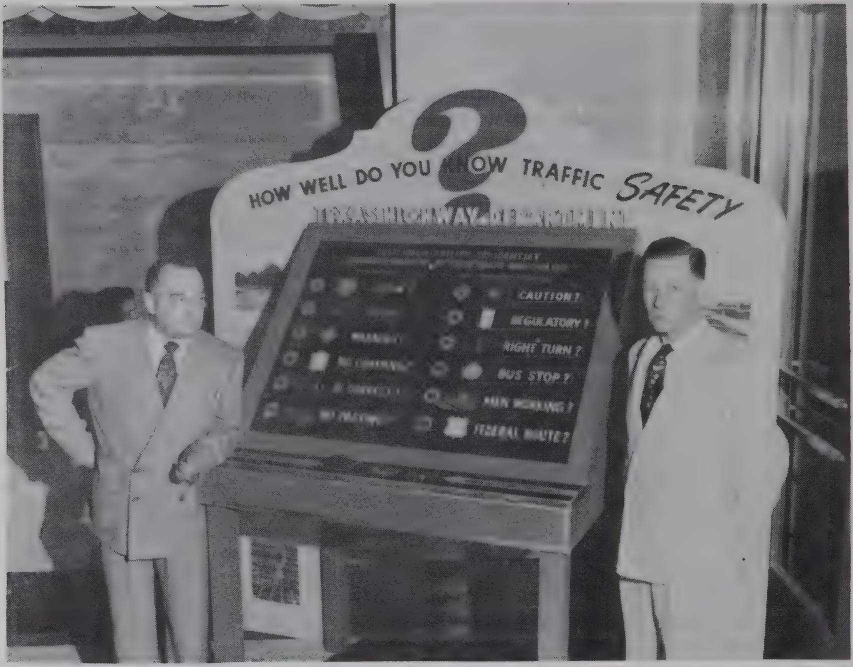


The reaction of the general public indicates that the exhibits have proved both interesting and educational and at the same time stimulated a greater appreciation and interest in all phases of our highway system. Our exhibits also afford an excellent opportunity to further our highway relations with the millions of fair-goers and to create a greater highway consciousness among the general public.

HOW WELL DO YOU KNOW TRAFFIC SAFETY

The [illegible] waited [illegible] to individually test their knowledge on the safety quiz machine.

The attendant distributes Texas Highway literature while [illegible] the pictorial [illegible] display.


HOW WELL DO YOU KNOW TRAFFIC SAFETY
TEXAS HIGHWAY DEPARTMENT
CAUTION?
REGULATORY?
RIGHT TURN?
BUS STOP?
MEN WORKING?
FEDERAL ROUTE?
WARNING?
NO PASSING?

Fred C. Bennett, Engineer, Traffic Services, and D.C. Greer, State Highway Engineer, in front of Safety Quiz Machine.

[illegible]

[illegible]

This Hay Bailing Business . . .

I have noted evidences of hay bailing on our right-of-ways after mowing as many bails of hay were stacked at infrequent intervals. It was only a few weeks ago that I was able to see this in operation, and the two attached pictures show a machine bailing hay on State Highway 85 in Quemado Valley.

I know that this occurs at many places over the State. As a matter of fact one time while I was serving as Maintenance Engineer in Austin I told a certain District Engineer that he could balance his budget by purchasing a hay bailer and going to work after mowing Johnson grass on various highways in his District and which had grown to a height of six feet or more. This is only a mere suggestion on my part in the spirit of attempting to get the Johnson grass mowed but sometimes I wonder if it would not be practical for us to do so.

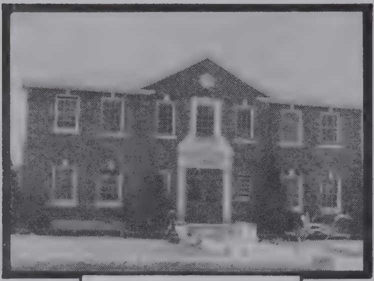
M. B. HODGES, *District Engineer*

Texas HIGHWAY DEPARTMENT District offices

GENERAL OFFICE-AUSTIN

DISTRICT 1, PARIS

DISTRICT 2, FT. WORTH



DISTRICT 3, WICHITA FALLS

DISTRICT 4, AMARILLO

DISTRICT 5, LUBBOCK

DISTRICT 6, PECOS

DISTRICT 7 SAN ANGELO

DISTRICT 8, ABILENE

DISTRICT 9, WACO

DISTRICT 10, TYLER

DISTRICT 11, LUFKIN

DISTRICT 12, HOUSTON

DISTRICT 13, YOAKUM

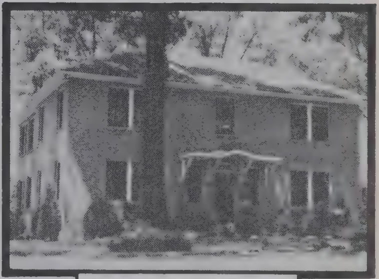
DISTRICT 14, AUSTIN

DISTRICT 15, SAN ANTONIO

DISTRICT 16, CORPUS CHRISTI

DISTRICT 17, BRYAN

DISTRICT 18, DALLAS


DISTRICT 19, ATLANTA

DISTRICT 20, BEAUMONT

DISTRICT 21, PHARR

DISTRICT 22, DEL RIO

DISTRICT 23, BROWNWOOD

DISTRICT 24, EL PASO

DISTRICT 25, CHILDRESS

Texas Highway Department
Form 433-B 11-49-40m

B780-1149-40m

INTEROFFICE MEMORANDUM

Date December 13, 1950

TO: Mr. J. A. Waller

Responsible D-16

FROM: Fred T. Bennett

Desk Traffic Engineering

SUBJECT: Highway Traffic Signals - Report on Semi-Actuated Installation with Pedestrian Push Button Actuation

In August, 1948, we approved a request from the City of San Antonio for authorization to install three semi-traffic-actuated signals with pedestrian pushbutton controls at three intersections along a high accident section of U. S. 90 on West Commerce Street just west of Lady of the Lake College.

In April, 1949, the City installed the authorized signals at the following two locations:

At U. S. Highway 90 West and San Felipe Street a span wire mounted three-section traffic signal, semi-traffic-actuated with push button control for pedestrians. This is a location for the sub-Post Office and only drug store serving this community. Three pedestrians were killed crossing at this location over an eighteen-month period. Cross-traffic volumes were not sufficiently high for fixed-time operation, but the accumulation of accidents of the type susceptible to correction by traffic signals warranted the traffic-actuated installation.

At U. S. Highway 90 West and Stevenson Street a span wire mounted three-section traffic signal, semi-traffic-actuated with push button controls for pedestrians. This is the school crossing location. Request was based on accident hazard, two pedestrians having been killed at this location and six having been injured over a two year period. Cross-traffic volumes were not sufficiently high to warrant fixed-time control.

On December 12, 1950, a representative of the State Highway Department contacted the City concerning the effectiveness of these two installations and received the following report from Captain John W. Fitch of the Traffic Engineering Bureau, City of San Antonio.

These signals were installed on April 8th and 12th, 1949, by a City maintenance crew consisting of an electrician and two laborers.

The two installations, including labor, materials and equipment, cost approximately $1,600.00. At the present time, with the increase in the cost of labor and equipment, a single installation of this type would probably cost $1,000.00 to $1,200.00.

The signal equipment consists of a four-way, three-section span wire mounted signal head, a semi-actuated controller, two non-compensated magnetic vehicle detectors, and four pedestrian push buttons at each intersection. The two vehicle detectors were installed on the cross streets in the approach lanes. The four pedestrian push buttons are installed about four feet above sidewalk level on pipes or pedestals that are located just to the right of the sidewalk approaches to the main street crosswalks. The vehicle detectors are installed across the approach lanes on the side streets perpendicular to the curb lines and about six inches underground. They are usually located about eighty feet back from the Stop line where the average approach speed on the cross street is between fifteen and twenty miles per hour, but they can be installed much closer if necessary.

The signal indications are normally green to the main highway and red to the cross street approaches, except when actuation by cross street traffic or pedestrians calls the green to the cross street. The green signal automatically reverts to the main street after cross street traffic has had opportunity to move safely through the intersection. The green signal then remains on the main street until recalled to the cross street, but it cannot be recalled until after the expiration of a fixed period which is set to allow all the accumulated traffic on the main street to clear the intersection. These signals are designed to operate on actuation twenty-four hours a day.

INTEROFFICE MEMORANDUM

Date

TO:

Responsible

FROM:

Desk

SUBJECT: Continued

The signals alone were not considered effective without additional controls to guide and protect the pedestrians. Stop lines and cross walk lines were marked on the pavement to concentrate and channelize the pedestrian traffic. Sidewalks were built along and approaching the main street to facilitate and encourage the use of the signalized intersections. Street lights were installed along this section of the highway to furnish better visibility and greater safety for night traffic.

A short period educational program was instigated to instruct both pedestrian and vehicle operators concerning the purpose and operation of these signals and the supplementary controls. A preliminary series of articles were sponsored by the newspapers prior to and following the date the signals were placed in operation. A traffic patrolman was assigned to each of the schools and conducted a series of classroom lectures until all the students had been contacted. A patrolman was also assigned to each signalized intersection from daylight to dark to instruct pedestrians in the operation of the signal and push button, and to restrict pedestrian traffic to the crosswalks. Originally, it was thought that the adults could be reached through the children by means of the classroom lectures and that police supervision at the signalized intersections could be limited to a couple of days. This was not the case and it was found necessary to assign patrolmen to the signalized intersections for a full week. However, the final results have been excellent and Captain Fitch reports almost perfect observance from both pedestrian and vehicular traffic.

Prior to the installation of traffic signals and street lighting, the construction of sidewalks, and marking of crosswalks and Stop lines, this section of highway averaged eight to ten fatalities per year, of which four or five were pedestrians, and between twenty and twenty-five pedestrian injuries. There have been no fatalities of any kind during the past twenty-one months since these signals were installed and only three pedestrian injuries in the past eleven months of 1950.

The maintenance cost on this type of installation has been comparable with the maintenance cost on the standard type fixed-time signal. It has only been necessary to replace two vacuum tubes and one condenser since these signals were installed.

Captain Fitch is planning another semi-traffic-actuated installation on U. S. 281 at the intersection of San Pedro Avenue and Fresno Street.

This intersection carries a sufficient volume of vehicular traffic on both U. S. 281 and Fresno Street to justify the installation of a fixed-time signal but the City has been so pleased with the efficient operation of the more flexible type of signal that they prefer to use the semi-traffic-actuated control. This is also a school crossing. About one hundred and twenty-five children cross here between 8 and 9 A.M., approximately fifty children cross at 12 noon and recross just before 1 P.M., and about one hundred and twenty-five children cross again between 3 and 4 P.M. The vehicular traffic on U.S. 281 is fairly heavy all day with medium traffic on the cross street. The periods of extra heavy traffic through this intersection are spasmodic with a heavy inbound movement in the morning on U.S. 281 and out of Fresno Street, and a heavy outbound movement out U.S. 281 and turning onto Fresno Street in the evening.

Using a signal of this type that operates in response to demand, and not on a fixed cycle, Captain Fitch says that he can move a much larger volume of traffic in a relatively short period of time. The chief advantage in his opinion is that this type signal will expedite the safe movement of the cross street traffic, both vehicular and pedestrian, immediately on demand, and at the same time reduce the delay to vehicular traffic on the main highway to a minimum.

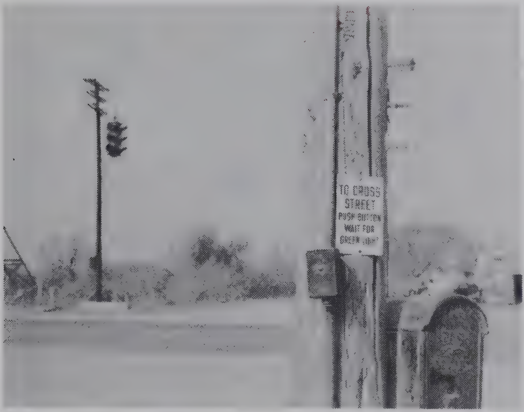
WmJA:bm

Looking east along U. S. 90 at intersection with Stevenson Street.

Close-up of signal head at San Felipe Street. (Note the semi-actuated traffic signal head is same as for fixed time -stop and go- signal with red lens at top, yellow below the red, and green below the yellow.

Looking south along Stevenson at intersection with U. S. 90. The state of improvement of this street indicates lack of cross traffic needed to justify a fixed-time (stop and go) signal.

Close-up of child actuating traffic signal by pushing button at San Felipe Street.



Close-up of push button and sign giving instructions for use of signal.

TO CROSS STREET PUSH BUTTON WAIT FOR GREEN LIGHT

Close-up of child actuating traffic signal by pushing button at Stevenson Street.

CUMULATIVE TOTAL OF CENTER STRIPI

FROM SEPTEMBER 1, 195

DISTRICT NUMBER	PAINT STRIPE	ASPHALT STRIPE	TOTAL COST	GALLONS OF PAINT USED PER MILE	PAINT STRIPE TOTAL MILEAGE
1					
2	1,024.13	1,054.42	2,078.55	16.96	10.02
3					
4	4,027.83	17,837.31	21,865.14	16.10	25.10
5	325.25	18,987.77	19,313.02		
6					
7	1,844.00	14,788.00	16,632.00	10.50*	29.00
8					
9	1,907.07	1,368.07	3,275.14	12.00	15.05
10	3,756.86	1,402.91	5,159.77	16.25	71.69
11	3,734.07	4,226.77	7,960.84	18.39	43.76
12	2,415.56	272.62	2,688.18	7.85	17.82
13		151.65*	151.65		
14					
15	5,826.99	6.510.32	12,337.31	17.85	53.89
16	1,754.35	5,376.69	7,131.04	15.10	17.62
17	794.32	3,038.45	3,832.77	16.49	7.58
18	2,972.93	5,751.63	8,724.56	15.03	39.62
19		7,876.70	7,876.70		
20					
21	719.07	588.19	1,307.26	17.00	6.80
22	97.93	2,471.89	2,569.82	20.08	.50
23	6,366.95	2,029.00	8,395.95	16.00	78.94
24	771.38	6,196.21	6,967.59	11.50	4.80
25					
	38,338.69	99,928.60	138,267.29		422.19

* District 7 - A large portion of stripe being placed over old stripe, so paint requirements proving to be less.

* District 13 - Cost for placing pilot line.

WORK PERFORMED BY DISTRICT

TO NOVEMBER 30, 1950

ASPHALT STRIPE TOTAL MILEAGE	TOTAL MILEAGE	PAINT STRIPE AVERAGE COST PER MILE	ASPHALT STRIPE AVERAGE COST PER MILE
26.67	36.69	55.06	39.54
406.00	431.10	160.47	43.93
504.16	504.16		37.66
324.70	353.70	63.50	46.00
35.96	51.01	126.72	38.04
144.40	216.09	75.24	23.13
86.00	129.76	85.33	49.15
2.11	19.93	135.58	129.14
111.77	165.66	108.12	58.25
95.62	113.24	99.58	56.23
51.12	58.70	104.79	59.44
118.62	158.24	74.99	48.49
159.80	159.80		49.29
9.90	16.70	105.74	59.41
20.78	21.28	196.65	118.96
43.00	121.94	80.65	47.18
136.90	141.70	160.70	45.26
2,277.51	2,699.70	90.80	43.88

No work performed in District 22.

Districts 1, 3, 6, 8, 14, 20, and 25 did not submit a report for November.

COMMISSION

FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT

STATE HIGHWAY ENGINEER
D. C. GREER

Paris, Texas
May 17, 1950

FILE NO. D-4

District No. 1
Equipment

SUBJECT: Rental Rates on Heavy Equipment

Austin Office: File D-4

You will find attached copy of graph showing history of "Equipment Rental," "Depreciation" and "Profit and Loss" on all equipment used in District No. 1, from 1943 to date. This information was secured from Form 153-B, "Monthly Report on Status of Authorization."

You will also find attached list of heavy equipment now in operation in District No. 1, together with purchase price and date purchased.

Based on monthly charges for depreciation furnished by the Austin Office on Form 301, "Tabulation of Equipment Expense and Rental," it appears that practically all of our equipment is set up for a life of 8 years. Information furnished to the District Office by the Austin Office at the time of purchase showed a life of 4 years for a number of units; however, it is our understanding that all heavy tractors, maintainers, and draglines are now set up for a life span of 8 years.

Based on observation in the field as to use of heavy equipment it is our opinion that it would be of material advantage to the state to reduce the life expectancy on heavy equipment to 5 years. If this is not done we will be faced with a large supply of worn out equipment which has not been paid for and with consequent unreasonable repair bills if equipment is continued in use.

We are about to enter upon one of the heaviest construction seasons in the history of District No. 1 at this time. The heavy equipment owned by the Department will take an unmerciful beating between now and January 1, 1951.

It is our recommendation that consideration be given at this time to increasing all rental rates in District No. 1 to 25% above their present rate.

It is also suggested that consideration be given to paying for idle time on equipment out of accumulated profit instead of charging to projects. The reason for this requested consideration is that practically all jobs that are constructed with state forces are extremely tight on money and extended spells of bad weather skyrockets the costs on these projects. Idle time charges are responsible for a large amount of these increased costs.

We would like to call your attention to the graph between 1944 and 1946, at which time we had a terrific loss on equipment. This loss was primarily due to the fact that we went into the war period with worn out equipment. It is our opinion that unless we arrange to pay out equipment now on hand in the District that we are likely to be faced with a heavier loss in the future should our work volume drop off and we be in possession of a large amount of worn out equipment.

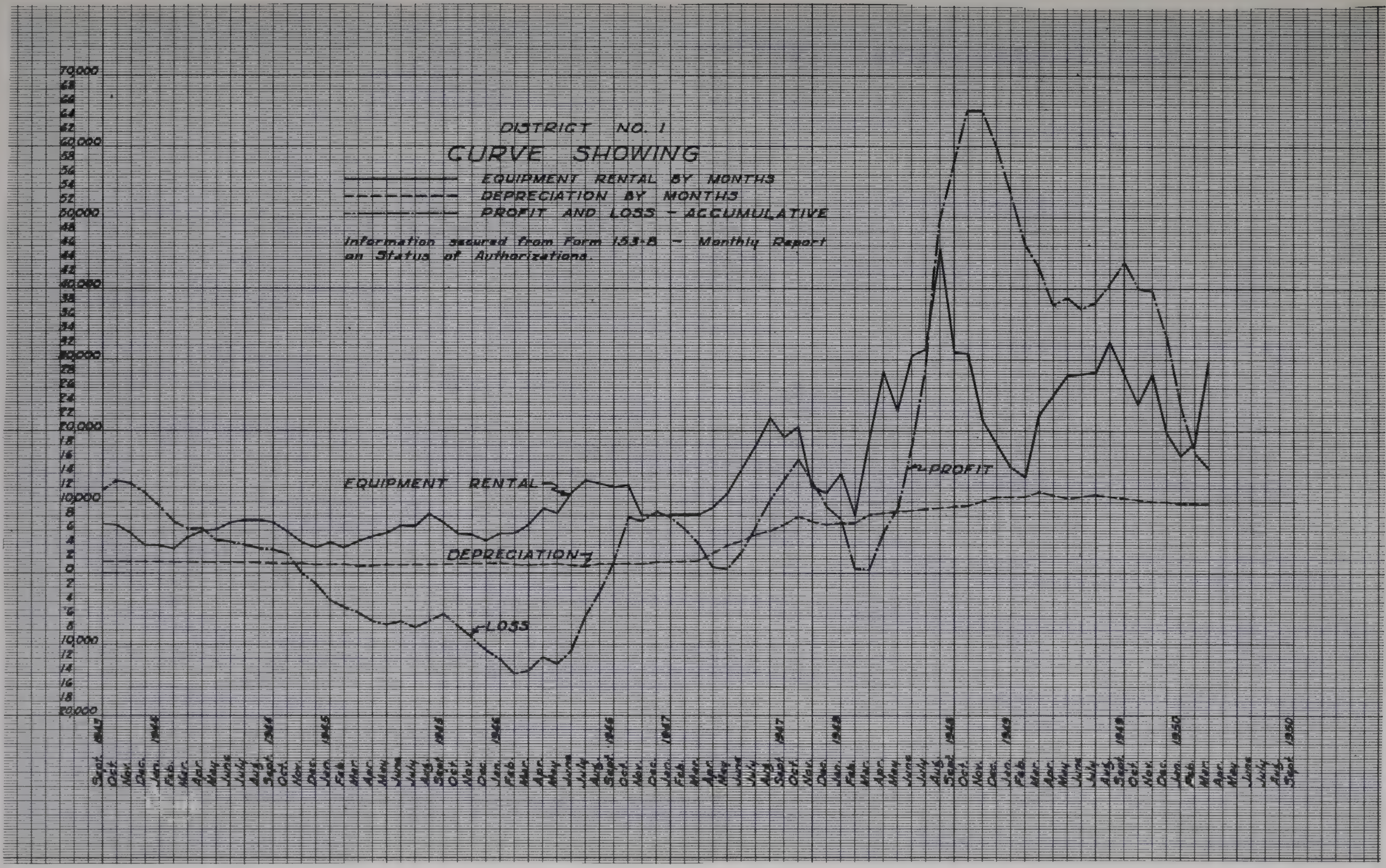
We would appreciate very much if D-4 would examine this information carefully and favor us with your recommendation in regard to the handling of this matter.

Sincerely yours

F. M. Davis
District Engineer

FMD:ep
Encls.

cc - Mr. J. W. Cravens


DISTRICT NO. 1
CURVE SHOWING
EQUIPMENT RENTAL BY MONTHS
DEPRECIATION BY MONTHS
PROFIT AND LOSS - ACCUMULATIVE
Information secured from Form 153-B - Monthly Report on Status of Authorizations.
EQUIPMENT RENTAL
DEPRECIATION
LOSS
PROFIT
70,000
68
66
64
62
60,000
58
56
54
52
50,000
48
46
44
42
40,000
38
36
34
32
30,000
28
26
24
22
20,000
18
16
14
12
10,000
8
6
4
2
0
2
4
6
8
10,000
12
14
16
18
20,000
Sept. 1943
Oct.
Nov.
Dec.
Jan. 1944
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July
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Sept. 1944
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Jan. 1946
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Sept. 1947
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June
July
Aug.
Sept. 1949
Oct.
Nov.
Dec.
Jan. 1950
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept. 1950

List of

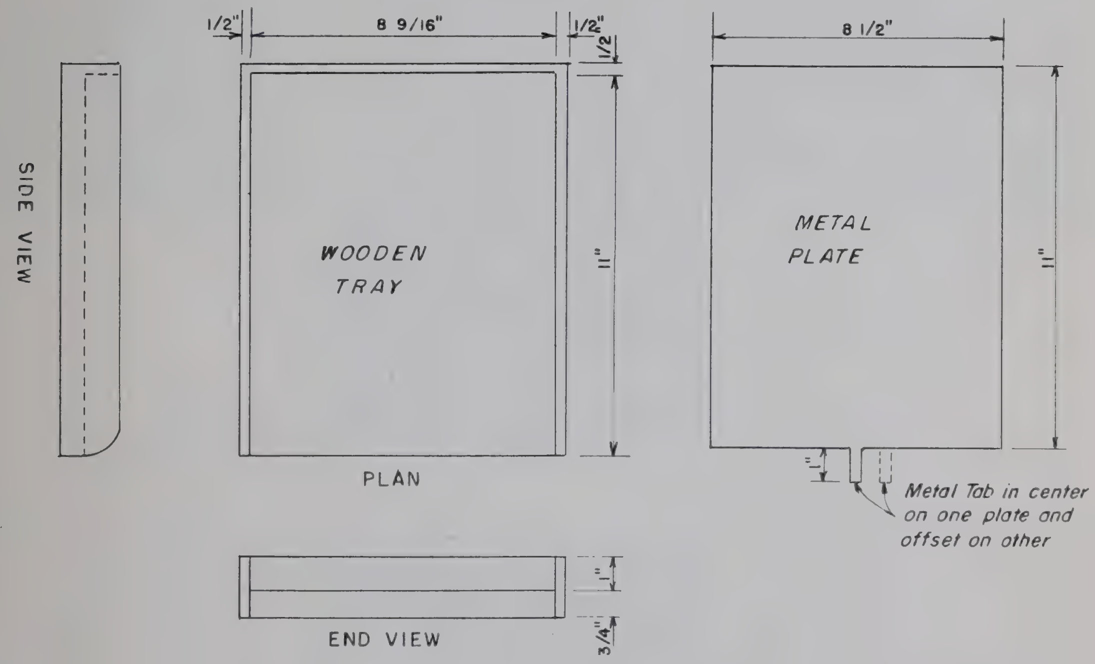
HEAVY EQUIPMENT IN DISTRICT 1

May 1, 1950

Equipment No.	Description	Purchase Price	Date Purchased
1089-A	Motor Grader, Rome 404	$12,572.58	4-15-47
1090-A	Motor Grader, Rome 404	12,572.58	4-15-47
1091-A	Motor Grader, Rome 404	12,572.58	4-11-47
1186-A	Motor Grader, Rome 404	13,195.00	2-20-48
1187-A	Motor Grader, Rome 404	13,195.00	2-20-48
1207-A	Motor Grader, Rome 404	12,693.55	4-27-48
1208-A	Motor Grader, Rome 404	12,693.55	4-27-48
1118-A	Motor Grader, Allis Chalmers AD-3	8,610.00	7-21-47
1119-A	Motor Grader, Allis Chalmers AD-3	8,610.00	7-22-47
1120-A	Motor Grader, Allis Chalmers AD-3	8,610.00	7-23-47
1280-A	Motor Grader, Allis Chalmers AD-3	10,678.47	10-30-48
1287-A	Motor Grader, Allis Chalmers AD-3	11,668.58	10-30-48
1288-A	Motor Grader, Allis Chalmers AD-3	11,668.58	10-30-48
1046-A	Motor Grader, Warco VD-140	7,969.69	8-17-46
1938	Motor Grader, Warco VD-140	6,174.20	7- 5-45
1285-A	Motor Grader, Warco VD-76	11,925.00	10-16-48
1286-A	Motor Grader, Warco VD-76	11,925.00	10-25-48
1301-A	Motor Grader, Galion 103	11,117.00	11-26-48
2591	Tractor Allis Chalmers HD-10	5,714.00	6- 4-41
2592	Tractor Allis Chalmers HD-10	5,714.00	6- 4-41
2901	Tractor Allis Chalmers HD-10	9,242.00	6-15-49
2827	Tractor Allis Chalmers HD-7	5,806.45	7-31-47
2828	Tractor Allis Chalmers HD-7	5,806.45	7-31-47
2715	Tractor Caterpillar D-7	5,411.00	5- 4-46
2849	Tractor International TD-18	9,570.00	8-29-47
2850	Tractor International TD-18	9,570.00	8-29-47
2851	Tractor International TD-18	9,570.00	9- 4-47
10372	Dragline Lorain 1/2 YD Crawler	13,773.25	4- 8-47
10382	Dragline Lorain 1/2 YD Crawler	11,582.00	10-10-47
10385	Dragline Lorain 1/2 YD Truck Mount	18,815.40	10-18-47
10393	Dragline Lorain 3/4 YD Crawler	17,425.90	11-16-48
10394	Dragline Lorain 1/2 YD Truck Mount	20,190.00	11-16-48
		$ 346,641.81	

DETAILS OF RIGHT OF WAY MAP FOLDING TRAY

District 22



The above sketch shows the Right-of-Way Map Folding Tray used in District 22 to fold the long Right-of-Way Maps.

It is very simple to build and use and folds the maps neatly and uniformly regardless of the length. You place the left end of the map in the tray against the left side, place one of the metal plates on the map, fold the map over, place the other plate on the folded map, fold over in the opposite direction, remove the lower plate and place it on the folded map and continúe this process until all the map is folded.

COMMISSION
FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT

STATE HIGHWAY ENGINEER
D. C. GREER

Waco, Texas
July 21, 1949

FILE NO. D-3

Equipment
District 9

Mr. D. C. Greer
State Highway Engineer
Austin, Texas

Dear Sir:

The recent accident in this District in which Mr. John J. Reed Mechanic was killed while working on the hoist of a Dump Truck has brought to our attention the need for a safety device on dump trucks to protect men while working under the raised dump body.

We have made a device which has been installed on three trucks in this District. This device is very simple and works automatically. It consists of a ball and socket joint which is bolted to the center of the bottom frame of the dump bed. A $1\frac{1}{4}$ inch steel rod is connected to the ball and socket joint. A small section of two inch iron pipe is welded onto a plate attached to the truck frame. A small steel clamp is welded on the side of the dump bed to hold the device when not in use.

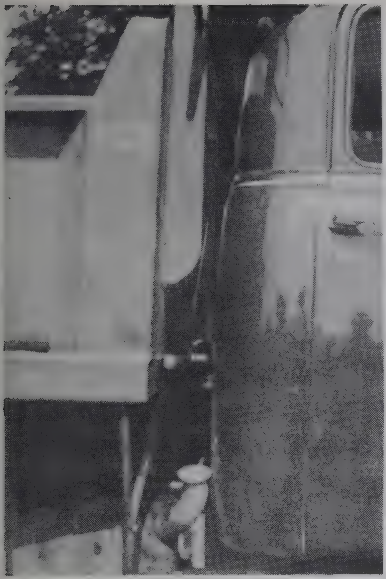
To place this device in operation the operator of the truck simply lifts the end of the steel rod out of the clamp and lets it fall to the frame of the truck. He then hoists the truck bed until the rod is suspended vertically then lowers the bed and the rod rests on the steel plate inside the two inch pipe.

We are enclosing six kodak pictures of this device which shows the complete operation.

Yours very truly,

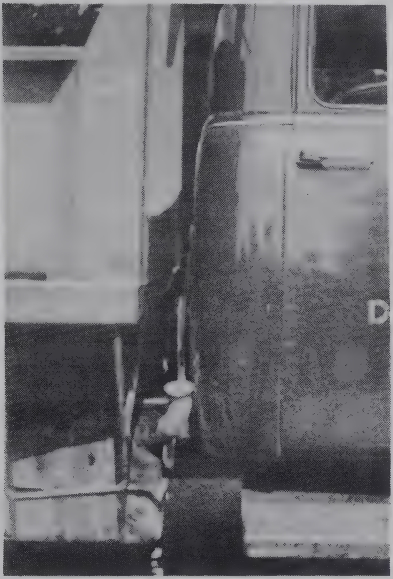
D. M. Puckett
District Engineer
District No. 9

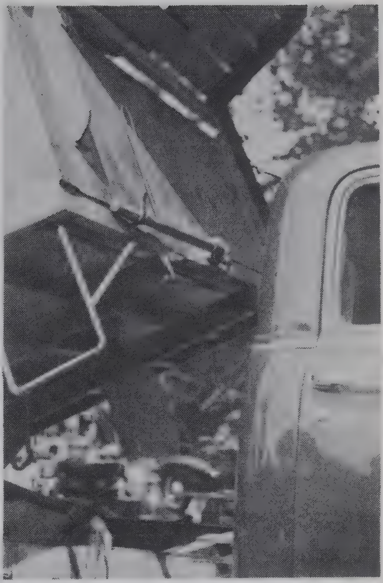
DMP:ba



Safety device attached to dump body, out of use.

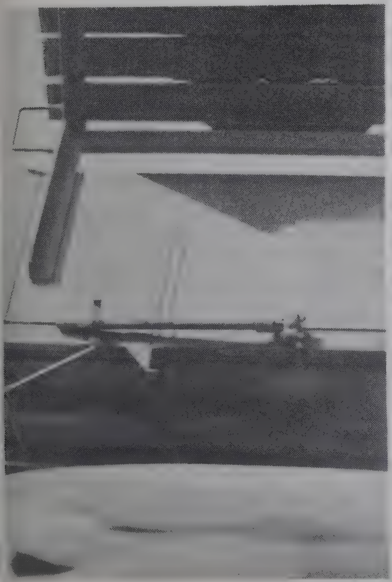
Rod of safety device removed from clamp and resting against frame of truck ready for use.

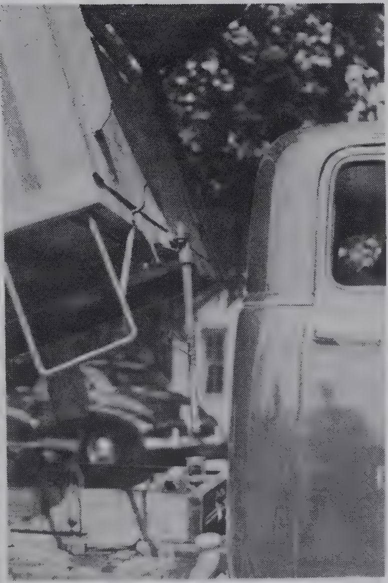




Dump body raised with safety device in clamp out of operation.

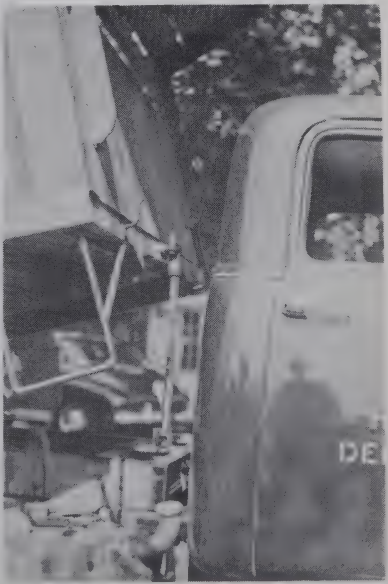
Looking over top of cab showing details of safety device out of operation.





Dump body raised and safety device in verticle position.

Dump body lowered and safety device in operation.



District 2 Asphalt School

Materials and Tests Division

During the week of September 11, 1950, the Asphalt Section of the Laboratory conducted, at Mr. W. W. Finley's request, a two-day school for two groups of five men each from District 2. The personnel consisted of the maintenance engineer and his assistant, seven maintenance foremen, and one construction foreman. The purposes of the school were to afford an opportunity for exchange of ideas and information between field and laboratory men and to promote a better understanding of the nature of asphaltic materials so that specific characteristics of the different products can be taken into account in field use.

As a background, a brief descriptive discussion was given on crude oil and how products such as gasoline, kerosene, diesel fuel, asphalt, etc., were separated out by various refining processes. Samples of different crudes were shown and the effect of the characteristics of the crude on the resulting asphalt processed from it was explained. The handling of the asphalt from the time it is ordered, sampled, tested, and shipped to the job, was outlined. It was felt that general information of this nature would be both helpful and interesting.

The men witnessed the various routine asphalt tests as run on penetration asphalt, cut-backs, road oils, and emulsions. Special demonstrations were also made to illustrate such things as the relative curing rate of RC-2's, special properties of emulsions, and the pouring of hot poured rubber-asphalt joint sealing compound, since these subjects appeared to be the ones in which the men were most interested.

Routine tests included viscosity, distillation, penetration, ductility, softening point, Oliensis, solubility, loss on heating, etc. The attached pictures of our Asphalt Laboratory give an idea as to some of the equipment used in testing asphalt. As each test was made, its particular significance was explained and correlated with field behavior. Following is a brief discussion of what was presented on a few of the more important tests, no attempt being made to include all tests and details.

Penetration and Ductility: It was explained how the penetration test is the basic measure of consistency or degree of hardness of all semi-solid or "penetration grade" asphalts which act as the binding medium in surfaces. This test also applies to the residues of the liquid materials since the major portion of cut-backs, road oils, and emulsions consists of semi-solid asphalt and is reduced to such in the laboratory by distillation and in the field by evaporation and oxidation.

The relation of ductility to penetration was shown by the OA-230 samples making very little more than the 70 cm. ductility as required, the OA-135 and OA-90 samples making 100 cm. and more, while an OA-30 made only 3 cm.

The men expressed considerable interest in knowing just what happens to the asphalt as it weathers in the road; and this penetration and ductility information was used to explain what has been found. Extractions and recovery of the asphalt from pavements have shown that when penetration falls to 20-30 the ductility probably will be below 13 cm. and brittleness and raveling sets in. Hence, ductility is somewhat of a quality test which is used to evaluate the adhesive properties, and it is not exactly how large the ductility is as it is the total absence of ductility. Examples were cited where Texas surface treatments were found to have dropped from 230 penetration asphalt to 28 penetration in seven or eight years; and this accounts for the necessity of sealing such surfaces every several years unless otherwise sealed more frequently for reasons such as slickness. The drop in penetration is less rapid in dense graded hot-mix asphaltic concrete since the air, moisture and sunlight are largely excluded from contact with the asphalt. For example, an OA-90 has been found to have a penetration between 40 to 50 after being in service for ten or twelve years.

The variation of penetration or hardness with temperature was stressed since this characteristic has important field implications. The results, shown below in Table I, were used to illustrate that an OA-230, classified as such at the standard temperature of 77°F., can display characteristics ranging from a semi-liquid to that of an OA-30 according to the weather conditions under which the work is being done.

Table I

Variation of Asphalt Consistency (Hardness) With Temperature

Temperature	90°F	85°F	77°F	70°F	50°F
Penetration	350+*	309	224	128	30

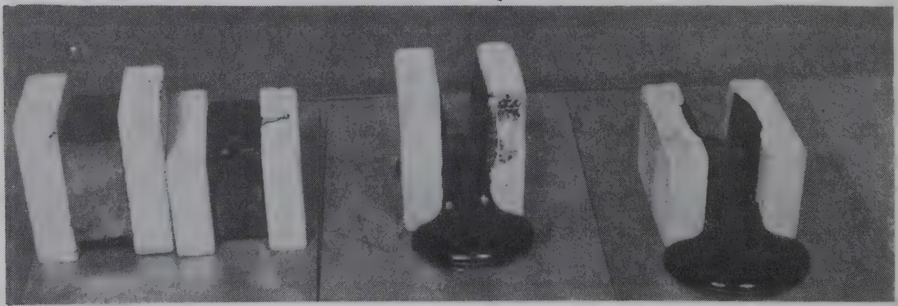
*Too soft to obtain accurate penetration

From the above data it is obvious that in applying aggregate to a surface freshly shot with OA-230 during 50°F. weather, we are in reality dealing with an OA-30 since, regardless of shooting temperature, the temperature of the asphalt becomes the same as the temperature of the base to which it is applied within a very short time. This rapid decrease in penetration with lowering of temperature readily explains the failure of semi-solid asphalts to "take" the aggregate during chilly weather construction. Field men are well familiar with such examples as the slight lowering of base and asphalt temperature especially when the temperature is already low, caused by the shadows of trees, embankments etc., resulting in reduced aggregate retention in those areas. Since aggregate embedment or retention varies with the hardness of the asphalt at time of application, it is obvious that liquid products such as emulsions and cut-backs offer some advantages in cool weather provided a type and grade has been selected to give early setting or developing of sufficient bond to hold the aggregate.

Softening Point: This test was used to illustrate how an asphalt may pass one test and yet fail another. Most asphalts when produced by ordinary methods from various crudes, have little trouble in meeting the softening point requirement for the paving grade asphalts. In the case of OA-30 used for pumping under and leveling up old concrete, the softening point is more critical since the asphalt is used in thick films.

The softening point increases as the penetration becomes lower, and the relation between softening point and penetration varies according to source of crude as well as method of refining. Oxidized asphalt has a high softening point for a given penetration and it is necessary to oxidize OA-30 by air blowing to meet our high softening point requirement of 185° F. Figure I shows three different OA-30 asphalts having different softening points.

The specimens in Figure I are one inch asphalt joints between concrete blocks; the asphalt on the left had a 77°F. penetration of 26 and a softening point of 185°F., the next asphalt had a penetration of 28 and a softening point of 189, while both of the blocks on the right contained a third asphalt



■OA-30 asphalts having approximately same 77°F. penetration but varying softening points. All samples exposed to air temperature for ten days.

having a penetration of 25 and a softening point of only 135. This low softening point asphalt was actually used by the Army Engineers for under sealing concrete, and resulted in failure to achieve the desired purpose since the asphalt did not have sufficient resistance to flow.

Distillation and Viscosity: The distillation test for cut-backs illustrated how the viscosity is controlled by the amount of solvent or cutter-stock added to a base asphalt to produce the liquid asphalt. For example, an MC-1 having a viscosity of 135 seconds at 77°F. was found to yield 48.5% by volume of cutter-stock or thinner by the distillation test. Thus, being relatively low in asphalt content and high in thinner, it is suitable for a prime coat as it will penetrate a relatively tight base. In the medium viscosity range of 200-275 seconds at 122°F., an RC-2 yielded 26.5% thinner while an MC-3 with a viscosity of 300-500 seconds at the higher temperature of 140°F. yielded only 24.5%.

The distillation also readily explained the difference between the curing rate of RC's and MC's. An RC-2 distillation was noted to have an initial boiling point of even less than 300°F. and was required to have at least 10% off at 437°F., while the initial boiling point of MC-1 or MC-2 was very near or higher than 437°F. This curing rate of cut-backs, especially RC-2, was one of the things in which the foremen were most interested because it has a significant influence on their surface patches or skin patches. Hence, a special demonstration was prepared in order to illustrate the relative curing rate of RC-2's and is discussed under the following Curing Index heading.

Curing Index (CI): The foremen stated that they had noticed a considerable variation in the curing rate of RC-2 and, in general, they felt that most of our RC-2 had been too slow curing for surface patching. RC-2 had the advantage over a penetration asphalt, like OA-135, of tolerating more dust and fines and also in the increased ease of embedding aggregate in even relatively cool weather. On the other hand, the soft residue of RC-2 does not set up sufficient bond soon enough to keep the aggregate from being kicked out at first by fast moving traffic.

Our distillation requirements on RC-2, although as strict as Asphalt Institute, Federal, etc., specifications, are sufficiently lenient to allow a noticeable difference in curing rate. The curing index (CI) is the term we apply to a numerical value which we calculate from the distillation results. Thus, an RC-2 having a CI of 80 will take eight times as long to cure as one with a CI of 10, and this amount of variation frequently occurs.

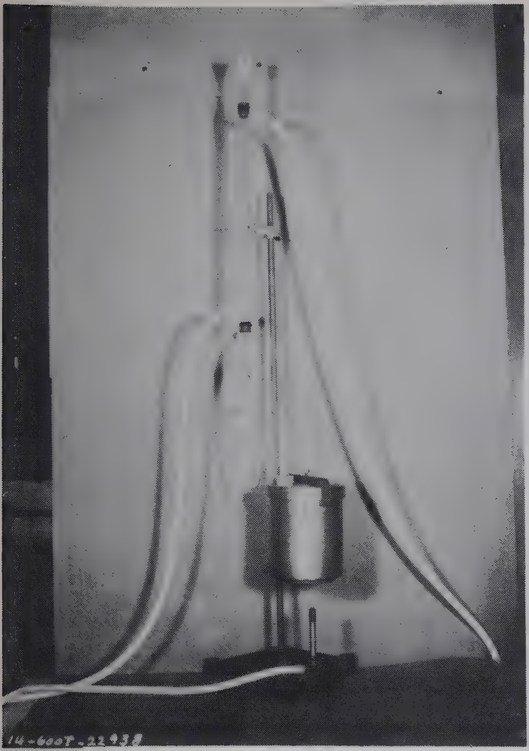
The CI was demonstrated by making three sand-asphalt mixes using 5% RC-2; the only variation being one RC-2 had a CI of 15, one 40, and one 65. All RC-2's met our specifications and all samples were mixed the same amount by hand and allowed to cure at room temperature (approximately 90° F.). Even with scarcely no aeration (stirring) the mix with the CI of 15 became noticeably stiff in thirty minutes and in approximately one and one-half hours was very stiff. At the end of four hours the mix with a CI of 40 was judged closely approaching a cured condition, while the one with the high CI of 65 was still soft and pliable. The volatiles remaining in each mix were determined in order to show that curing depended on the relative amount of volatiles evaporated to that remaining in the mix. Figure II shows the volatile trap method used in determining the amount of volatiles remaining in the mixes, the relative amounts thus found being shown in Figure III.

The actual amounts of volatiles obtained was 0.1cc. for a CI of 15, 1.1cc. for CI of 40, and 2.0cc. for CI of 65. Thus, the relative stiffness of the mixes due to each RC-2 having reached a different consistency was found to be according to the amount of volatiles still remaining in the mix. These results were explained to the foremen as having the following significance: In the case of a seal coat or surface patch, this would mean that the CI material of 15 would be faster in developing a harder consistency and thus a stronger bond, and would result in less aggregate being kicked out by early traffic. In terms of a blade mix it meant that a material with a CI of 15 might set up so fast that it probably would not allow sufficient time for mixing and spreading. For dense graded premix it would mean that the CI of 15 would result in setting up even in the stockpile in a day or so while a CI of 65 would require excessive blading in order to lose sufficient volatiles to have adequate stability, lack of which would result in shoving under traffic.

Thus far, experience has shown that a medium CI of 25 to 40 is desirable for premix and road mixing, and both Districts 1 and 2 have now ordered RC-2 with a maximum CI of 20 for seal coat and surface patching.

Emulsions: District 2 has used considerable high viscosity emulsion for seal coats, hence, the men were interested in learning about some of its special characteristics. Emulsions do represent an entirely different type of asphaltic product, and although they have some very definite and highly desirable properties, they are somewhat tricky to use. Past use has shown that many sad experiences and "messes" have resulted from lack of knowledge of these special properties.

It was demonstrated how the emulsion could be broken by either heating in the distillation (evaporation on road is similar but slower) or chemically by the demulsibility test which corresponds to the addition of "hard" water in field use. Quick-break emulsion was completely broken by adding only 35cc. of a very weak calcium chloride solution while an equal volume of slow-break emulsion was not affected by 50cc. of a calcium chloride solution five times as strong. Checking the ease with which emulsion breaks in this manner is known as the demulsibility test and is shown in Figure IV. The

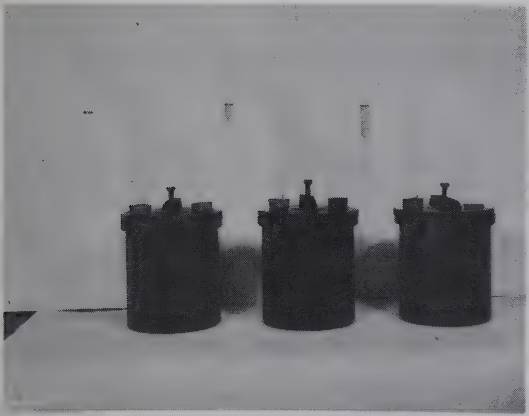


■ Volatile Trap Set-Up

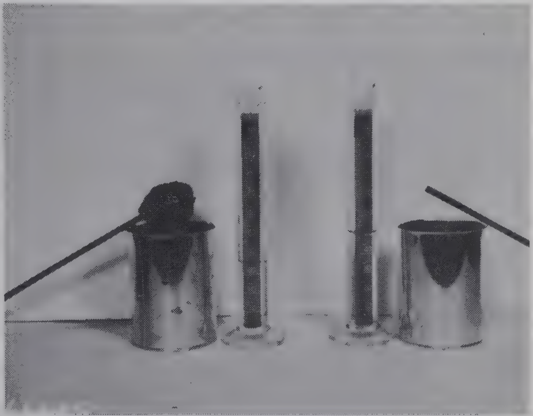
ball of asphalt accumulated on the stirring rod as the solution was added to the quick-break emulsion on the left, and since there was no break in the other emulsion, the rod remained free of asphalt.

As each particle of asphalt is surrounded by water, anything done to disturb the water phase of the emulsion may break it. Cautions listed to be observed were excess heating, dilution with water, freezing, and settlement as a result of too long a storage without agitation. The mixture of asphalt and water resulting from a broken emulsion is extremely difficult to clean out of a distributor or tank.

The demulsibility test also showed why emulsion developed a stronger bond sooner than RC-2. A quick-break emulsion gives the advantages of a liquid product in initially embedding and sticking aggregate and also quickly furnishes the strong bond afforded by penetration asphalt. Use of slow break emulsion therefore requires the holding off of traffic longer because very little bond strength develops until the emulsion is broken. Also, the slower the break, the more danger it is of having the emulsion washed out by rain. The fact that emulsion does mix with water accounts for the reason that very wet aggregate is permissible.



■ Relative amount of volatiles obtained from three RC-2 mixes after curing four hours. CI of each RC-2, Left 15, Center 40, Right 65.



■ Demulsibility Test - Left, quick break. Right, slow break.

Since this joint material is a mixture of asphalt and rubber, it has properties entirely different from pure asphalt and must therefore be handled differently. Overheating causes it to become excessively soft and sticky as well as having little resistance to flow, whereas heating pure asphalt to a higher temperature will harden it. It was explained that this sealer usually will not pour under about 370°F. and may even have to be above 400°F., although it will not stand 450°F. very long.

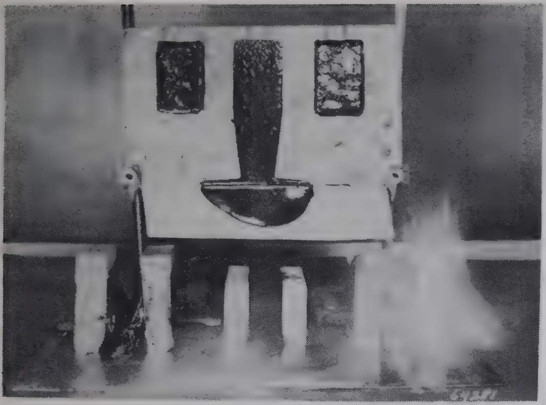
Samples were melted in order to acquaint the men with its appearance and consistency, as it never reaches the same smoothness and fluidity of pure asphalt.

The fact that overheating practically always occurs in a direct fired kettle was illustrated by the picture shown in Figure V. The flow test is used to measure the effect of heating on this material. This test consists of pouring up a test panel 1/8" thick, allowing it to cool, then holding it at 140°F. for five hours with the panel at a 75° angle from the horizontal.

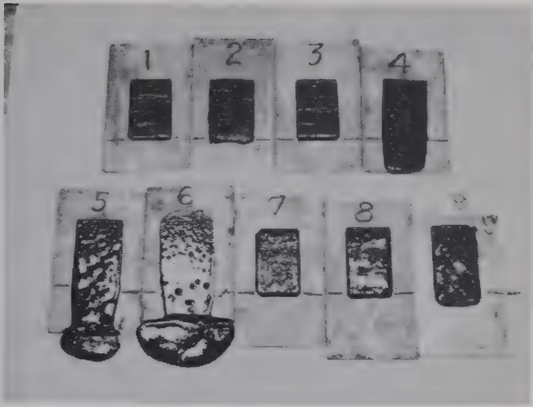
Samples PP-U and F-H shown in Figure V were taken from two different oil jacketed kettles on the job, and although they show 0.3 cm. and 0.5 cm. flow, respectively, on top panel, they are considered satisfactory. Sample S-2 was dipped up from a puddle at the end of the joint and the flow

Table II

Pour No.	Type of Heating and and Stirring	Time Min.	Pour Temp. °F.	Flow, cm. See Fig. 6
1	Indirect: Oil bath 485-500°F. Continuous mechanical stirring.	35	325	0.2
2	No. 1 Continued	50	400	0.3
3	Direct-fired pot. Continuous hand stirring.	30	320	0.2
4	Indirect: Same as 1	80	450	2.7
5	Direct-fired pot. Stirred only once each 10 min.	45	400	3.5+ (Off panel)
6	No. 5 Continued	65	440	5+ (Off panel)
7	Direct-fired pot. Constant hand stirring.	30	370	0.2
8	No. 7 Continued	40	400	0.5
9	No. 8 Continued	52	420	1.2



■Flow samples after five hours at 140°F. Samples PP-U and F-H melted by oil-jacketed kettles; sample S-2 by direct-fired kettle.



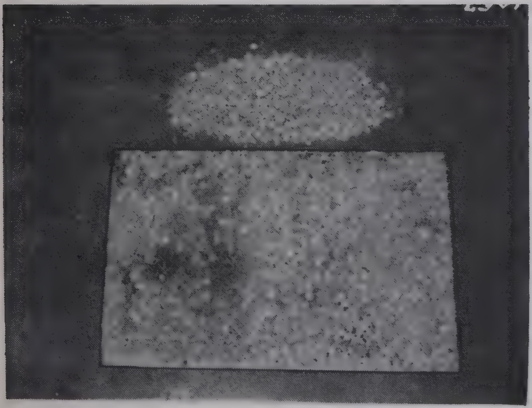
■Showing effect of heat on rubber-asphalt sealer. See Table II.

in the picture as well as from the joint shows that it was ruined by a direct-fired kettle.

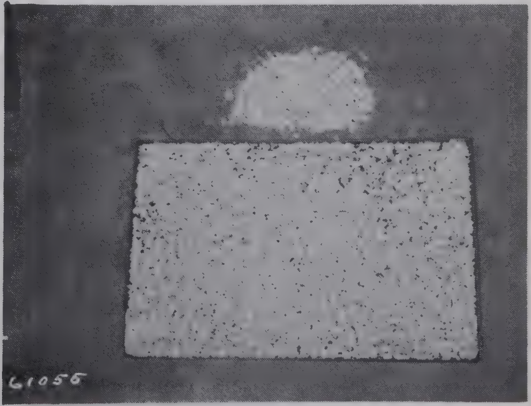
The effect of the amount and type of heating and stirring was further illustrated with pictures showing the results of several series of tests previously run. Table II and Figure VI show the conditions and results of one such series.

Since this material varied in sensitivity to heat according to producer and from shipment to shipment, the men could only be cautioned to use all possible care in pouring it, as it may even be overheated in a motor agitated and oil jacketed kettle. The 450°F. maximum pouring temperature, mentioned on the bags, does not mean the material should be heated that hot, but rather it should be poured at the lowest temperature possible in order to flow and give a seal. The 450°F. temperature is a critical one and should be watched for material requiring even a temperature approaching 450°F.

The excellent sealing properties of rubber-asphalt compound were illustrated by having the men



■OA-135 with aggregate containing 12.6% of -10 fraction.



■Same aggregate and asphalt as in Figure VII but containing no -10 fraction.

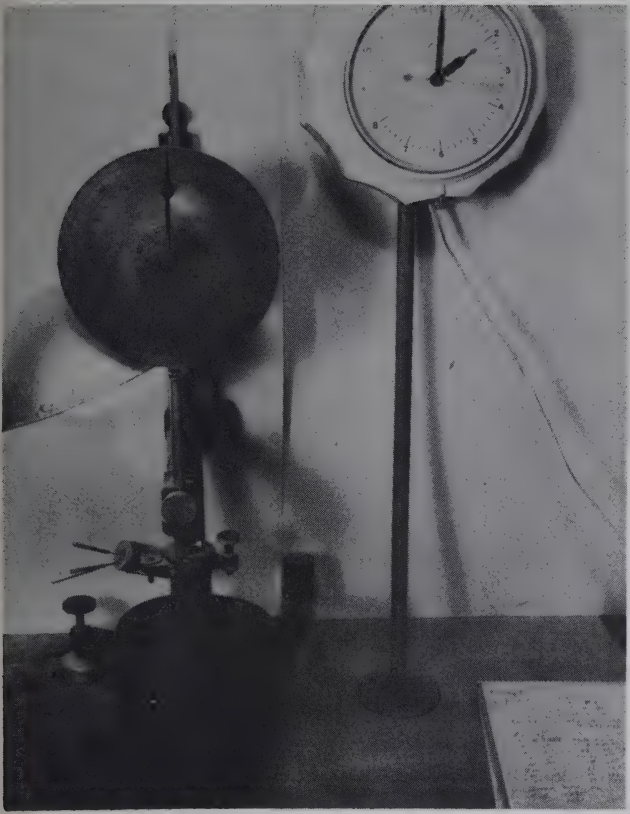
witness the bond and extension test which actually extends a one inch joint to one and one-half inches at 15°F. It was pointed out that thus far this material was the only material tested that would maintain a seal at this low temperature, and hence it was felt that the extra care and equipment needed in putting it down were probably justified.

Seal Coats: In addition to the factors affecting seal coats and surface patches already mentioned, other points were discussed. The men were familiar with our aggregate retention test as it had been demonstrated to them in the District Lab. It was pointed out that the aggregate grading and particularly the 1/4 - 10 fraction had a significant effect on the results to be obtained on a seal coat using penetration asphalt. The retention test showed excellent correlation with the field in that an aggregate containing approximately 30% of the 1/4 - 10 fraction resulted in a poor job, whereas one with only 10% of this fraction resulted in an excellent job. When the grading of the aggregate containing the larger amount of 1/4 - 10 fraction was adjusted to that of the other aggregate, the retention test showed that almost identical results could be expected with both of them.

A second example was cited to emphasize the importance of not allowing an excess of the -10 size over that permitted by specifications for aggregates used in surface treatments or seal coats. Figure VII shows the appearance of the surface and the amount of loss (72% of total) for an aggregate containing 12.6% of -10 material. Figure VIII compares this aggregate without any -10 fraction and applied at the same rate and using the same amount of OA-135. The elimination of the -10 fraction cut the loss of aggregate to 30.5%.

The experimental seal coat sections recently placed by District 14 were visited as well as some of this District's regular high viscosity emulsion seal coats. These sections contained various aggregates, washed and unwashed, and some precoated in various ways; however, little difference could be detected at the time in the amount of retention of aggregate. All were placed with 0.15 gal. per sq. yd. of emulsion and aggregate at the rate of 1 to 170, and since emulsion tends to overcome dust, fines, etc., the loss of aggregate was very little on any of the sections. District 14 personnel emphasized two points other than the general benefits of using emulsion and they are as follows: (1) use only a minimum amount of asphalt on bleeding surfaces; 0.15 gal. per sq. yd. of emulsion amounts to only 0.1 gal. of residual asphalt; (2) only a certain amount of aggregate can be stuck and any additional is not only wasted, but causes broken windshields; 1:170 of Item 305 No. 1 aggregate appeared to be sufficient.

Closure: Maintenance men are keenly aware that constant vigilance is necessary in obtaining materials of high quality and that such factors as contamination or other form of injury during transit, storage, etc., render the

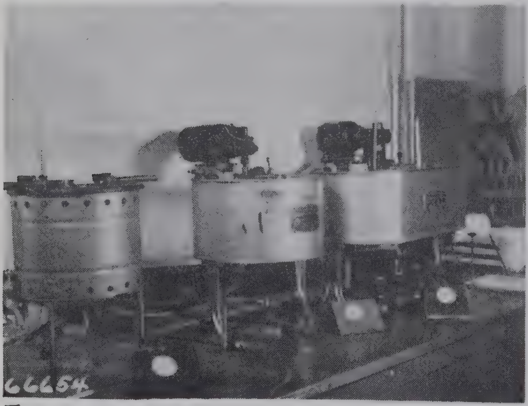


Close-up of the Penetrometer for determining penetration of asphalt.

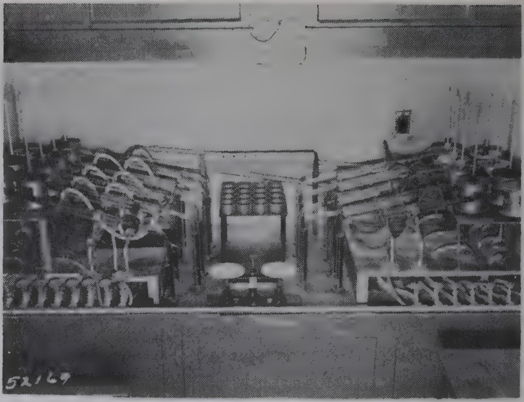
Oil-jacketed pot for melting rubber-asphalt joint material.

original tests on the material useless as a criterion of quality. For this reason the Materials and Tests Division is especially anxious for the field men to send in samples of any product where they have reason to doubt its quality regardless of previous tests. No charge is made for check tests of this type.

Recently, one District submitted a sample representing the remains of a tank of RC-2 which had caught on fire. Tests showed that the material had essentially been reduced to an OA-175, and although damaged, "cracked" by the burning of the volatile fumes, still could be used as an OA-175. Other samples of asphalt sent in from distributors or storage tanks at job sites have revealed contamination and extreme softness of asphalt that explained the lack of bonding action that was very apparent. These examples illustrate the need of constant attention and occasional check samples on materials.

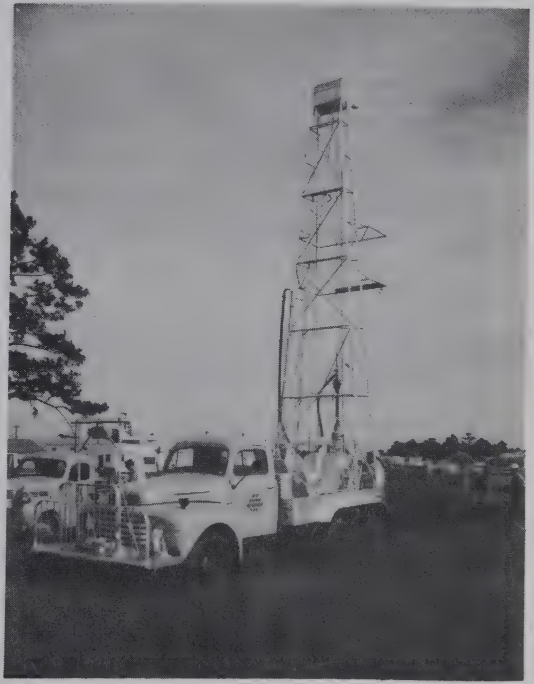

■Viscosimeters for determining the viscosity of cut-backs, lube oils, and diesel fuels.

■Center foreground is the 77°F. water bath. Center background is the distillation set-up shown below. To the left by the door is one ductility machine and two others may be seen to the right of the water bath.


■Set-up for distilling-cut-back asphalts.

■Pour-up table showing penetration asphalt samples such as ductility, penetration, softening point, flash, specific gravity, Oliensis, and loss on heating.

Both field men and laboratory personnel seemed to enjoy the opportunity to discuss various materials problems and exchange ideas and information. It is felt that the Highway Department as a whole can gain much from such refresher courses, and the Materials and Tests Division extends a special invitation to all interested Districts to take advantage of the equipment and personnel of the central laboratory for such purposes.



NEW CORE DRILLING RIG

EQUIPMENT AND PROCUREMENT DIVISION

Pictured above is the latest addition to our Core Drilling fleet. This new rig, a "Failing" Model 750 Hole-Master, is expected to fill a much needed place in our core drilling operation. Cost of the rig and supply truck was $24,506.55. The first job of the new rig, put into operation the week of December 4, was drilling foundation holes for the new District 12 office building. Pictured in front of the rig are C.O. Duncan, Core Driller, D.O. Cleveland, Assistant Core Driller, and Parley Conley, Assistant Core Driller.

COMPARISON IN PRICE ON CARLOAD QUANTITIES OF MAINTENANCE MATERIALS

FISCAL YEAR SEPTEMBER 1, 1939-1940 WITH FISCAL YEAR SEPTEMBER 1, 1949-1950

EQUIPMENT AND PROCUREMENT DIVISION

Material	Amount 1939-1940	Price	Amount 1949-1950	Price
Asphalt Centerstripe	1,718 Tons	22.85	82 Tons	47.40
Asphalt - MC-1	520 Tons	15.15	3,522 Tons	25.41
Asphalt - MC-2	496 Tons	14.30	1,436 Tons	23.53
Asphalt - RC-2	4,276 Tons	15.29	27,077 Tons	26.59
Asphalt - RC-2MA	2,422 Tons	16.37	520 Tons	27.31
Emulsified Asphalt - EA-6SDW	50,000 Gals.	.0668	73,600 Gals.	.1024
Emulsified Asphalt - Stencil No. 5-48-1596	1,504 Tons	18.01	52 Tons	26.95
Oil Asphalt - OA-55	180 Tons	18.68	385 Tons	32.86
Oil Asphalt - OA-90	200 Tons	15.55	104 Tons	33.85
Oil Asphalt - OA-135	1,124 Tons	12.86	8,636 Tons	22.99
Oil Asphalt - OA-230	2,659.5 Tons	14.54	7,882 Tons	22.56
Road Oil - RO-3	4,744 Tons	12.65	78 Tons	26.05
Asphaltic Concrete - Type K	390 Tons	3.65	1,780 Tons	4.34
Asphaltic Concrete - Type M	26,737 Tons	3.54	9,040 Tons	4.70
Asphaltic Concrete - Type M-1	7,940 Tons	3.52	400 Tons	4.67
Coldmix Limestone Rock Asphalt	16,925 Tons	3.24	203,155 Tons	4.33
Duraco Pavement Mixture	781 Tons	2.88	2,440 Tons	5.02
Cement - Normal Portland	17,879 Bbls.	2.40	29,971 Bbls.	2.56
Diesel Fuel Oil	151,000 Gals.	.0359	897,000 Gals.	.0751
Premolded Expansion Joint Material	210.78 Sq. Ft.	.118	100 Sq. Ft.	.258
Flexbeam Guard Rail	37,487.5 L. F.	.59	52,901 L. F.	.9084
Gravel	52,051 Tons	1.75	177,089 Tons	2.45
Gravel	9,130 C. Y.	2.44	51,623 C. Y.	3.18
Lumber - Creosoted	1,355.311 MFBM	63.24	996.999 MFBM	144.40
Lumber - Untreated	593.009 MFBM	32.40	857.879 MFBM	123.50
Lumber - Wolmanized	21.333 MFBM	50.34	24.533 MFBM	139.00
Paint - AP-1	30,000 Gals.	.404	30,000 Gals	1.79
Piling - Creosoted	29,225 L. F.	.50	22,149 L. F.	.835
Post - Dome	3,000 Each	.63	11,300 Each	1.52
Post - Treated	48,300 Each	.64	8,885 Each	1.53
Pipe - Concrete Culvert	132 L. F.	2.38	16,378 L. F.	2.69
Pipe - Corrugated Galvanized Culvert	9,310 L. F.	2.09	25,244 L. F.	4.34
Sand	5,189 Tons	1.58	5,450 Tons	1.85
Sand	2,159 C. Y.	1.59	1,753 C. Y.	2.39
Sand - Concrete	4,102 Tons	1.56	8,085 Tons	2.06
Crushed Rock Salt	32 Tons	9.30	165 Tons	17.04
Shell - Type B	1,600 Tons	1.46	7,500 Tons	1.90
Shell - Type B	24,137 C. Y.	.78	120,045 C. Y.	1.13
Stone - Crushed	46,995 Tons	2.22	106,091 Tons	2.73
Stone - Crushed	2,680 C. Y.	2.43	48,042 C. Y.	3.14
Steel - Reinforcing	1,008,373 Lbs.	.0307	1,469,638 Lbs.	.0585
Steel - Structural	272,744.5 Lbs.	.0428	173,845 Lbs.	.0677
Stakes - Pine	799,000 Each	.0048	2,681,000 Each	.0132

"Comments From the Traveling Public"
OVER THE HIGHWAYS

...Texas is a very interesting state. I always wanted to visit Texas. The highways are super, and the highways are marked so that even a child could understand them. I hope to return to your nice state again.

J. B. Drummond
Jasper, Alabama

...Some of the route markers in the larger cities are not plentiful enough. Houston and Dallas were particularly difficult...

Elizabethton, Tennessee

...We liked your roads, your markings, and your general way of handling everything, also the safe and sane set up all around...

E. R. Urbine
Santa Ana, California

...Good roads, nice weather, but highway markers were insufficient to strangers in large cities for fast traffic. Patrol information officer was very courteous and kind...

San Francisco, California

...During our short stay in your state, the thing that impressed us most was your nice wide roads and good by passes around such cities as Dallas and Fort Worth. The next time we go east, we are going through Texas.

Tucson, Arizona

...Suggest that road signs indicate distances to cities...

Fairfield, California

In the past week we, three other teachers and I, have come frighteningly near having two serious accidents. While returning to . . . from . . . School via Highway . . . , we suddenly, without any warning drove upon men doing road repair work. The first instance occurred in . . . We were driving about thirty miles per hour when the car in front suddenly swerved to the left to avoid men chipping and pouring asphalt in the cracks between the slabs of concrete. If we had been driving fast or too closely following the car before us, we would have run over the flagman and the workman. There were no warning signs and the flagman was standing within five feet of the workman. The only signs we saw were behind the workman, and they were no warning to us.

Yesterday a similar and even narrower escape occurred. We were driving between . . . and . . . in fairly heavy, fast-moving traffic. We moved out to pass a big truck heavily loaded with logs, and the traffic in front of us suddenly stopped. We were driving about forty-five miles per hour, too fast to stop that suddenly. Again without any warning we had driven upon workmen pouring asphalt. The first flagman was about twenty-five feet ahead of the second who was almost abreast with the workmen. Neither of the flagmen could be seen because of the heavy traffic. Again the signs were placed behind the men working where they did no earthly good.

We talked with the maintenance foreman, Mr. . . . , but he assumed, very politely you understand, the attitude that it was an impossible situation and we, women drivers you know, were to blame. We are really distressed by these near accidents, and appeal to you for some safety measures that will remedy the situation.

Mr. . . . says that the situation is impossible because: 1. People don't pay any attention to signs; 2. If signs are put up, people knock them down; and 3. The men and tractors move so fast, 45 seconds per strip, that road blocks are impractical. These reasons do not seem reasonable to us. Perhaps some people don't pay any attention to signs and do knock signs over. This seems like nothing at all when compared to knocking over and perhaps killing a workman.

We think that you will agree that it isn't an "impossible situation" and will do something about it. We shall appreciate your efforts in helping us save a life -- most certainly our own and if possible that of your highway workmen.

Yours truly,

(Signed)

...Every state should have roadside parks and information bureau services like Texas...

Kansas City, Kansas

...Roadside parks were fine except they do not have water fountains or rest rooms. These would be a welcome sight to weary travelers. We hope to return to Texas soon...

Mr. & Mrs. C. H. McGowen
Chicago, Illinois

...Your roadside parks were greatly appreciated, however, please try and fix some of those bad pavement sections on Route 80...

H. F. Johnson
Berwyn, Maryland

...Your roadside parks do not compare with some in Ohio. (Roads and weather extra fine)...

Mrs. Harry Covode
Toledo, Ohio

...Suggest covered containers be provided for garbage and rubbish in roadside parks instead of open barrels--table tops were dirty, and odor bad.

C. J. Caddell
Madison, Wisconsin

Your article on "Preventive Maintenance Work," which you had recently published in the November issue of Construction and Maintenance, is very worthwhile.

It is my thought that perhaps this should be followed through and maybe other construction ideas will come in from other districts on this matter, in that I agree that the thought expressed by you in the Bulletin, that it is one of the most talked about things and the least done about it, of any single operation that we perhaps carry on in the Texas Highway Department.

I sincerely hope that we will receive some good benefits from this article.

G. M. Garrett
Deputy State Highway Engineer

Mr. W. E. Simmons (District Engineer)
Beaumont, Texas

I take this opportunity to express my appreciation for the good work rendered by your maintenance group on Highway 87 two miles southwest of Burkeville today. They saved three houses and one car from burning up beside the highway from a forest fire.

One of the homes was mine and the other home owners asked me to express their thanks and appreciation to your department and the men who rendered the great service in a time of need. Thanks a million. . .

A. Brailsford
Route 1, Box 10A
Burkeville, Texas

R. LEE MORRIS, PRESIDENT
A. T. MORRIS, VICE-PRESIDENT

W. H. TALLANT, CASHIER
N. G. STACK, ASST. CASHIER

THE FIRST BANK OF CHICO, TEXAS
ATED)
CAPITAL-RESOURCES-SURPLUS
$500,000.00
ESTABLISHED 1895
CHICO, TEXAS,
November 21st, 1950

Mr. W. W. Finley
District Engineer
Texas Highway Department
Fort Worth, Texas

My dear Mr. Finley:

Your courteous and comprehensive letter of November 17th has just come to hand, and I appreciate your consideration and comments . . .

I appreciate every word of your comments regarding ranchers placing themselves in a position for the State to assist them in setting up protection against fires. When I wrote the letter to the Commission, some ranchmen had called on me and told me what was going on West and North of us. At the moment, I knew nothing about the State's aiding ranchers bordering on the highway, and I took the advantage of this information and asked assistance by the State, which all ranchers West of us sorely need. You know everything revolves around the banker, and he is expected to take the initiative.

Thanks for the fine way your Department has responded to our request. Your (representatives) called on me promptly and told me when they would be in our area, and I passed the information to other ranchers who were eligible for assistance. Your equipment with competent men came on the job, and are on the highway now making fire lanes and burning the grass from them to the pavement. I have a heavy water machine with hose and sprayers, we are using this in connection with your water wagon in burning the grass along the highway, and we are having remarkable success.

I appreciate your observation with reference to all ranchers constructing fire lanes before grass and weeds die, and from now on I think your suggestions will be adopted and carried out; I know I shall take advantage of them.

Please let me thank you and the Commission again for the fine support you are giving us, and I assure you that we appreciate the assistance. If I can be of any worth to you in any way, feel at liberty to call on me, adding warm personal regards and cordial good wishes, I am

Yours very truly,

R. Lee Morris, President

RLM/JB

CC: D. C. Greer
State Engineer

COMMISSION

FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT

STATE HIGHWAY ENGINEER
D. C. GREER

Fort Worth, Texas
December 4, 1950

FILE NO. D-18

Maintenance General
Wise County

Mr. D. C. Greer
State Highway Engineer
Austin, Texas

Dear Sir:

In regard to your telephone conversation on November 13 with Mr. Spencer of this office concerning the letter from Mr. R. Lee Morris of Chico about grass fires we would like to let you know the action taken in this case and also, the measures being taken throughout this District to minimize grass fire hazards.

Fire control measures have just been completed in the Chico area. The soil is very erosive and this, together with the sixty foot right-of-way and the deep ditches on State Highway 24 in that area, made it impractical to blade on the right-of-way; therefore, we cut fire guards on the adjacent property and assisted in burning the grass between the fire guard and the pavement. Our forces cut the fire guards designated and cleared by the property owners and we furnished water trucks and men primarily to keep the grass burning from getting out of control and also to reduce the hazard to highway traffic. In the work we used four men about twelve days and two maintainers about eight days. Mr. Morris seemed very well satisfied with the assistance we proposed to give when we contacted him the day after your telephone call, and we feel sure he is pleased with the results.

Throughout the District we are blading the grass from the shoulders out to the flow line of the ditch where erosion is not excessive and we are assisting, when requested, in burning the grass. At the present time we are using most of our maintainers on this work, plus about eight machines rented locally. The bulk of this work should be completed in the next few days.

By doing the work mentioned in this letter, we feel that the District is doing all it can be reasonably expected to do in reducing the unusual grass fire hazards, and it appears that the property owners are generally well pleased with the assistance we are giving.

Yours very truly,

W. W. Finley

W. W. Finley
District Engineer

RWS:s
cc: File D-3

JACK ROACH, FIRST VICE PRESIDENT
C. K. BOYT, SECOND VICE PRESIDENT
M. A. FULLER, TREASURER

RAY W. WILLOUGHBY, PRESIDENT
HENRY BELL, SECRETARY & GENL. MANAGER

ERNEST DUKE, ASSISTANT SECRETARY
JOE G. MONTAGUE, ATTORNEY
CHAS. A. STEWART, TRAFFIC COUNSEL

TEXAS AND SOUTHWESTERN CATTLE RAISERS ASSOCIATION
410 EAST WEATHERFORD STREET
FORT WORTH 3, TEXAS

December 19th, 1950

Mr. DeWitt C. Greer
State Highway Engineer
Austin, Texas

Dear Mr. Greer:

Many ranchmen have talked to me this fall, since it has turned so dry, and all of them have complimented the Highway Department for the work they have done in scraping fire guards and assisting in the burning of grass from the concrete road bed to the guard. In fact, I have a letter from Mr. L. B. Hapgood of Henrietta, Texas complimenting your department, which I received today.

I don't believe that any of us get enough pats on the back and most of us are too easy to find fault, so when any group of people express themselves as being well pleased with the work that your Department has done, in scraping fire guards, I feel that it should be passed on to you.

Ever since appearing before your commission some four years ago, all of your employees have been very cooperative in protecting grass all over the State.

Very truly yours,

Henry Bell

Secretary-General Manager

HB:cw

COMMISSION
FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT
AUSTIN 14, TEXAS

STATE HIGHWAY ENGINEER
D. C. GREER

January 3, 1951

FILE NO. DCG

Mr. Henry Bell
Secretary-General Manager
Texas and Southwestern Cattle Raisers Assn.
410 East Weatherford Street
Fort Worth 3, Texas

Dear Mr. Bell:

Please accept my sincere thanks for your taking the time to write me your nice letter of December 19, extending the compliments of your membership for the work done by our employees this fall in trying to prevent grass fires. I am taking the liberty of passing your letter on to the members of the Highway Commission and that staff that is involved with this problem in order that they may also have the pleasure of reading your most inspiring letter.

With kindest personal regards,

Sincerely yours

DCGreer

D. C. Greer
State Highway Engineer

DCG:dns

December 20, 1950

Mr. D. C. Greer
State Highway Engineer
Capitol Station
Austin, Texas

My dear Mr. Greer:

I employ and have employed during my life quite a few men and I know that I sometimes overlook, or am not able to see, some of the sterling qualities of an employee with whom I do not often come in contact, and when I fail in this respect I always appreciate some one who can observe the man and who knows of his fine qualities that will take the trouble to tell me about them.

You have in this district an employee by the name of .... I believe he is one of your maintenance men. I have only met this man once in my life, which was a number of years ago, but I have talked to him a number of times over the telephone, and whether I call him at his home or at the Department Warehouse, he is always most courteous and willing to cooperate, and appreciates any reports that I might have to give him on things I thought was for the betterment of the highways in his district.

Recently I was talking to two property owners in this area, one a ranchman, and one a dairyman. These men also had very complimentary things to say about Mr. .... One was in connection with his cooperation in preventing fires and in rendering assistance when fires were out. The other man complimented him on the way he kept the shoulders of his roads, how he was very conscientious in looking after the entrances into the various farms and ranches, and that whenever you called on him or reported a matter to him, you did not get the answer that "We are simply too busy to take care of it," but on the other hand he always thanked the person calling and told them that the matter would be taken care of as soon as he could get to it, and he was not long in getting to it.

Another case that I have heard of was where after he and some of the men were combating a fire, the man gave him an order for a Stetson hat. He refused it. Said he could not accept any gifts, that the Highway Department was always glad to assist and cooperate with the land owners along the highway.

Another ranchman offered him a piece of beef, which he turned down with the same explanation that he could not accept gifts. Now, to me this is a most unusual attitude for a man in his position to take. There was no intent of offering Mr. .... pay for what he had done but merely to show an appreciation for his neighborly act, but it proved beyond a shadow of a doubt his honesty and integrity, his willingness to be of assistance and to build goodwill for the Highway Department.

I have occasion to travel over some of his roads and they are all in good condition and are kept that way. The right of ways are kept clean, and I could not let this Christmas Season go by without writing you this letter, as I feel that you have in Mr. ..... an employee that you can trust and depend upon, and that some day you may have a better place for him than the one that he now has.

I do not know Mr. ..... intimately, as stated above, but I do know he has built for himself a reputation of which any man could be envious and I know that the Highway Department is very fortunate in having this type of man as an employee.

With my very kindest regards and best wishes for the Christmas Season, I am

Yours very truly,

(Signed)

COMMISSION

FRED A. WEMPLE, CHAIRMAN
A. F. MITCHELL
ROBT. J. POTTS

TEXAS HIGHWAY DEPARTMENT
AUSTIN 14, TEXAS

STATE HIGHWAY ENGINEER
D. C. GREER

January 3, 1951

FILE NO. DCG

Mr. ....
..., Texas

Dear Mr. ...:

During the ten years that it has been my privilege to serve as State Highway Engineer, I do not remember receiving a letter that has impressed me as did your of December 20, relating particularly to our Maintenance Foreman in ... County, Mr. ...

We have two hundred and fifty of these maintenance foremen scattered in the various counties throughout the State. They are our frontline men. To the average citizen of the State, they represent the Texas Highway Department. The State Highway Commission, the State Highway Engineer and our other officials are not known to most of the people of the State, but these maintenance foremen are the direct contact men that either make or break our relations with the public. Your most kind and complimentary remarks of the work of Mr. ... represent my ideal of that which we desire in one of these men. Mr. ... has been with the Department seventeen years, having started with us as a common laborer in ... County. He is a native Texan, having a family of six children. Undoubtedly it is the ... that have made America the wonderful place that it is today.

I have been so impressed with your letter that I have taken the liberty of reproducing it and distributing it throughout our entire organization, blanking out the exact names and places, with the thought that it may give inspiration to our men in other sections of the State. I hope that this is satisfactory to you.

Please accept my sincere thanks for your taking the time to write this very fine letter.

Sincerely yours

DGreer

D. C. Greer
State Highway Engineer

DCG:os

Mr. Frank Cawthorn, District Engineer
Dallas, Texas

Being a frequent traveler on U. S. 75 between Corsicana and Dallas for many years, I know every curve, turn, and rough place. I know how I have agonized over that narrow, no-shouldered stretch from Wilmer north.

During the past few months I have seen improvements being made at apparent small cost. The S curves have been widened and banked, dirt shoulders have been graveled. Yesterday I saw the large, new "DANGEROUS CURVES" signs.

Truly this highway has been transformed--transformed from a nightmare and deathtrap to a road that our State Highway Department need not be ashamed of.

To you, my District Engineer, I want to say, "Thank you."

Sincerely, your constituent,
Mrs. Glynn Mitchell Johnson

September . . . , the maintenance crew in . . . County painted a yellow strip down Highway . . . where it passes through the property of . . . , a local cattle dealer who deals in registered Holstein cows. In the process some member of the Department took a bucket of paint, or a strainer through which the paint had been running, and knocked it on a fence post, knocking out the paint onto the ground and threw the strainer over into Mr. . . . enclosure, as well as the five-gallon paint container and the lid from same. At that time, or shortly thereafter, three cows belonging to Mr. . . . ate or licked up some of this paint and died. Dr. . . . , a local veterinarian, made an autopsy of these cows and took the paint from the stomach of the three cows.

All of this matter was taken up with the local Highway Department and with the District Office in . . . and finally with Mr. . . . , the head of the maintenance department in . . . . , and possibly a letter was written directly to you. Nothing was ever done. Mr. . . . had this little piece of land fenced off to keep the other cows from getting into it, but last week three other cows did get into this enclosure and now they are dead.

It seems that Mr. . . . is suffering quite a good deal of expense through the fault of the Highway Department of the State of Texas. This office is fully aware of the fact that the State of Texas is not liable for torts and we are actually of the opinion that an appropriation would have to be made to pay Mr. . . . , but it is difficult for us to understand why a citizen would have to suffer for the stupidity or neglect of employees of the Highway Department of the State of Texas, and we want something done.

Yours very truly,

(Signed)